



AN ASSESSMENT FOR USAID/CAR ON THE TRANSBOUNDARY WATER AND ENERGY NEXUS IN CENTRAL ASIA

FINAL REPORT

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ABBREVIATIONS AND ACRONYMS

ADB	Asian Development Bank
AMC	Anti-Monopoly Commission, KZ
AEAI	Advanced Engineering Associates International
AES	AES Corporation
ASBP	Aral Sea Basin Program
BKwh	Billion Kilowatt Hours
BVO	River Basin Management Organization
BWA	Basin Water Authorities
BWM	Basin Water Management
CA	Central Asia
CACO	Central Asian Cooperation Organization
CAR	Central Asian Republics
CAEC	Central Asian Economic Community
CAREC	Central Asian Regional Economic Cooperation
CIS	Commonwealth of Independent States
CST	Collective Security Treaty
CSTO	Collective Security Treaty Organization
DFID	Department for International Development (British)
Disco	Distribution Company
DSS	Decision Support System
EBRD	European Bank for Reconstruction and Development
EEC	Eurasia Economic Community
EU	European Union
FSU	Former Soviet Union
GEF	Global Environmental Facilities
Genco	Generation Company
JSC	Joint Stock Company
ICKKU	Interstate Council for Kazakhstan, Kyrgyz Republic, and Uzbekistan
ICWC	Interstate Commission for Water Coordination
IFAS	International Fund for Aral Sea
IFI	International Finance Institution
KEA	Kazakhstan Electricity Association

KEGOC	Kazakhstan Electric Grid Operating Company
KOREM	Kazakhstan Operator of Electricity Market
MAWR	Ministry of Agriculture and Water Resources, UZ
MCM	Million Cubic Meters
MkWh	Million Kilowatt hours
MW	Megawatt = million Watts
NARUC	National Association of Regulatory Utility Commissioners
NOPI	Naryn Cascade Operation Planning Instrument
NRMP	Natural Resource Management Project
PA	PA Consulting
PTRA	Power Trade Relations Agreement
RAO UES	Federal Grid Company of Russia
REC	Regional Electricity Companies
REEPS	Regional Electricity Export Potential Study
SCO	Shanghai Cooperation Organization
SDC	Swiss Agency for Development and Cooperation
SIC-ICWC	Scientific Information Center of ICWC
TACIS	Technical Assistance to the Commonwealth of Independent States
Transco	Transmission Company
TWEP	Transboundary Water and Energy Program
UNDP	United Nations Development Programme
UTCE	Union for the Co-ordination of Transmission of Electricity
UDC	Unified Dispatch Center
USAID	United States Agency for International Development
USEA	US Energy Association
WARMAP	Water Resources Management and Agricultural Production
WARMIS	Water Resources Management Information Systems
WEC	Water and Energy Consortium
WB	World Bank
WRC	Water Resources Committee
WUA	Water User Associations
WUASP	Water User Associations Support Program

EXECUTIVE SUMMARY

BACKGROUND

US Agency for International Development/Central Asian Republics (USAID/CAR) is currently conducting an assessment of what its future role should be in supporting the development of the water and energy sectors in the Central Asian Republics (CAR). USAID has pursued regional cooperation in energy and water for many years. In late 2004, USAID launched an assessment of the situation and the implications for the future. A consultant team from AEAI/MWH together with experts from the USAID/CAR Mission and USAID Washington participated in fieldwork and interviews in four of the five CAR countries. This assessment is seeking to define the specific components of a future program that it can support relating to its Strategic Objective 1.6. - “Improved Management of Critical Natural Resources, Including Energy” that addresses the region’s transboundary water and related hydropower resources.

Many changes have taken place in the CAR region since a similar assessment was last conducted for USAID in 1999¹. The conclusion and recommendations of this previous assessment has provided the direction to and the basis for the formulation of USAID’s program of support to the region during the 2001 to 2005 period.

This assessment is expected to include a review of the status of current policies, laws, practices, regional institutional capabilities, trends, and planned directions of CAR countries. It also includes a review of the development and support programs of other bi- and multi-lateral donors and International Financial Institutions (IFIs) in the region. Reflecting information gained during the review, the consultants have been tasked to define key issues and to make recommendations on a possible package of energy and water nexus activities that USAID could support during this next five-year period to best help the countries of Central Asia achieve their water and energy sustainability and management goals.

Since the last 1999 USAID/ CAR assessment, the countries of Central Asia -- being led by Kazakhstan and with the exception of Uzbekistan -- are increasingly implementing changes that will help them make the ultimate transition from centrally-managed to market-based economies. Representing a “demonstration country” that displays the benefits of market-based reforms in its electricity sectors, Kazakhstan, is, in fact, nudging other countries in the region along the same path. Both the Kyrgyz Republic and Tajikistan, now show clear signs that they will be following that path, as exemplified by the fact they are beginning to sell power into the southern Kazakhstan energy market and the interconnected Russian market to the north. The beginnings of an open access regional energy market are also becoming increasingly evident in the region.

Developments in the water sector have, however, been less favorable. The dispute between the CAR countries over the allocation of storage in the Toktogul Reservoir -- whether for irrigation, electricity production, or a blend of the two -- continues. Although some progress has been made in rehabilitating irrigation infrastructure, water wastage in irrigation continues to be very high, thereby leading to low yields and diminished agricultural output. Yet, despite these

¹ Vahid Alavian, Jack Keller, Frederick Guymont “An Assessment of Water Management in Central Asia and Recommendations for Future USAID/CAR Technical assistance”, USAID/CAR, December 1999

realities, recent developments in the region have given reason for hope for more rapid change in the sector. For example, USAID on-farm efforts have demonstrated that simple changes in irrigation techniques can result in significant increases in agricultural output. Moreover, at a more macro level, current proposals to organize the Water and Energy Consortium (WEC) under the President-led Central Asian Cooperation Organization (CACO) give the AEAI Team reason to believe that future progress will be made in resolving regional water disputes that have in the past impeded the development of CAR economies since their independence.

AEAI / MWH PROJECT ASSESSMENT TEAM

It is within this context that a team of consultants was assigned the task of conducting an assessment of regional transboundary water and energy nexus issues in the CAR region. USAID/CAR issued Task Order No. EPP-I-00-03-00004-00802 that outlines “An Assessment for USAID/CAR on the Transboundary Water and Energy Nexus in Central Asia”. Advanced Engineering Associates International (AEAI) was selected to conduct this assessment under its Energy II Indefinite Quantity Contract (IQC) with USAID. AEAI is the prime Energy II IQC contractor to USAID, and it has utilized the expertise of its subcontractor Montgomery Watson Harza (MWH) to assist it in this assignment.

AEAI selected three specialists to conduct the assessment. Its Team included Mr. Peter Donalek (Senior Power Systems Studies Specialist, MWH), Mr. Richard Rudberg (Senior Water Resources Planning/Hydro Specialist, AEAI), and Ms. Olga Mandrugina (Energy & Environmental Policy Specialist and AEAI Project Manager/Coordinator). The Team conducted its assessment in close coordination with USAID/Washington, the USAID/CAR Regional Mission, and USAID/Country Representatives in the region. Staff members from USAID/Washington and USAID/ CAR (including USAID country representatives) accompanied the Team to many of its meetings.

CAR COUNTRY ASSESSMENTS

From a regional viewpoint, Kazakhstan recognizes its role as a regional leader, and it appears ready to contribute more than other CAR countries to the resolution of the region’s water problems. Although initial efforts to create the Water and Energy Consortium (WEC) were begun by Kazakhstan, Uzbekistan is also a supporter of the WEC since it has evolved from a concept they had promoted in the 1990’s. A significant impediment to achieving the cooperation envisioned under the WEC may, nevertheless, still be Uzbekistan, whose government officials may resist in the end, elimination of the provision for annual negotiations in the final agreement ultimately reached by the parties. . Another important member’s – the Kyrgyz Republic – key stumbling block seems to be the suggestion of other WEC participants that a transfer of control of Toktogul Reservoir operations should be made to the WEC. The Kyrgyz Republic’s Vice Prime Minister in Charge of CAR Relations has indicated that this transfer “will never happen”, thus reflecting their belief that the energy security needs of the Kyrgyz Republic are not consistent with the regional focus of the WEC.

Overall, USAID assistance in brokering the 1998 Framework Agreement regarding the use of the Syr Darya waters is remembered and widely appreciated in the region. Many officials interviewed requested that USAID again assist with future negotiations between CAR countries, which seek to modify that Agreement and/or develop a new agreement. A Kyrgyz official indicated that the three CAR countries that are members of the Eurasia Economic Community (EEC) have developed a new agreement for allocation of storage of Toktogul based on a review

of agreements signed by other countries with Transboundary Rivers. The EEC, an organization that the Kyrgyz Republic believes best represents its interests, was formed in 2000 and includes Kazakhstan, the Kyrgyz Republic, Tajikistan, Russia, and Belarus. As it is apparent that USAID is well regarded in the Kyrgyz Republic for their work on the 1998 Framework Agreement, USAID has a considerable degree of leverage in this matter.

The Uzbekistan Ministry of Foreign Affairs emphasized that it continues to support the 1998 Agreement. It has declared that the 1998 Agreement is “still in force and it works”; however, despite its declaration of support, Uzbekistan has not participated in the annual negotiations called for in the 1998 Agreement during the last two years. Nevertheless, it has been suggested that negotiations between countries, conducted within the framework of WEC, would still be initiated using the 1998 Agreement as the base document in the negotiations.

Differences in geography -- as well as in the characteristics of the regional water resource -- may largely explain the divergence of views of different CAR countries. Although geographically Uzbekistan is a downstream country for the Syr Darya, it is located in the middle reach, and as a spokesman in the Kyrgyz Republic pointed out it “gets the water anyway.” On average, only about one-third of the water required for irrigation in the downstream countries is derived from Toktogul storage; and in years when water from other sources (downstream tributaries, groundwater, middle reach reservoirs, and other sources) is abundant, allocations from Toktogul are not essential to Uzbekistan. Thus, from Uzbekistan’s rather risky short-term viewpoint, during the years where there is no need to compensate the Kyrgyz Republic for storage, they would rather seek to achieve savings by not having to pay for their allocation, especially during current periods of marginal national growth.

On the other hand, as the upper most country on the Syr Darya, the Kyrgyz Republic is the country, which at least from appearances should be in control of Toktogul storage. In fact, however, they view their situation differently. Subsequently, they seek a long-term agreement from other CAR countries that recognizes their need for winter fuel -- either in amount of barter or cash amounts that are adequate to purchase fuel to meet winter heating needs -- regardless of the water use profile of the downstream countries in a particular year.

Being a middle-reach country on the Syr Darya but an upper reach country on the Amu Darya, Tajikistan’s views represent a mixture of other CAR countries, supporting both a continuation of a modified 1998 Agreement with its requirement for annual negotiations, as well as a new agreement with longer lasting arrangements.

Finally, as the most downstream country on the Syr Darya -- and, therefore, the most vulnerable-- Kazakhstan is expected to support a new agreement that offers greater security for meeting their own irrigation requirements and that also provides adequate water flow to the Aral Sea. However, consistent with their role as a leader and a downstream country, a spokesman for the Kazakhstan Ministry of Foreign Affairs pointed out that Kazakhstan and Uzbekistan both have a common interest.

FINDINGS SUMMARY

- The Kyrgyz Republic continues to have a winter energy supply problem and must import fossil fuels to meet electricity and thermal heat requirements. The supply of these fuels in exchange for summer electricity exports remains uncertain. The Kyrgyz Republic does not have the funds to pay for the fuels directly due to poor collections and high

technical and non-technical losses. The Kyrgyz Republic has shifted the operation of Toktogul Reservoir from an irrigation-oriented regime to a winter electricity generation regime to meet its national energy needs.

- Kazakhstan has made progress in establishing a competitive, wholesale market based on bilateral contracts between generators and distributors or industrial consumers. With its high rate of economic growth, electricity demand is rising rapidly and shortages are expected in the next several years if new capacity is not available.
- Uzbekistan has sought to reduce the negative impacts of Kyrgyz winter water releases by building downstream water regulation structures. Uzbekistan also wishes to avoid becoming further dependent on electricity imports. Uzbekistan has been an obstructionist in both the water and energy areas due to its physical location in CAR (river basin and power transmission grid).
- Both the Kyrgyz Republic and Tajikistan wish to further develop their hydro resources and storage capacity and increase exports to the region. However, given the expected cost of building new hydroelectricity generation capacity, both countries need to access export markets before further hydro generation development is feasible.
- Russia is increasing its involvement in the CAR energy sector and is proposing financing hydro capacity expansion in both the Kyrgyz Republic and Tajikistan.
- Downstream water use efficiency is low and donors have experienced problems in implementing projects to address improvement in water management, especially in Uzbekistan.
- Countries and donors expressed receptivity to stronger USAID role in addressing regional energy and water issues.
- Afghanistan needs imports of low cost power to replace expensive electricity generated with diesel fuel.

CONCLUSIONS SUMMARY

- The energy side of the water energy nexus will likely drive the issues on the water side of the nexus for the near term.
- There is a clear rationale for developing separate strategies for upstream and downstream water problems but assessment tools (models) are needed to define impact once they are logically divided.
- Although some of the provisions are still valid, it is important to go beyond the 1998 Framework Agreement and its emphasis on growing season focused energy exchanges.
- The United States has an interest in promoting North-South interconnections and the development of an integrated regional energy market (CAR/Afghanistan)
- Good potential exists for closer collaboration between Kazakhstan and the Kyrgyz Republic in operating their energy systems for mutual benefit.
- The WEC is a desirable regional approach since it is being driven by CACO (leaders of the nations involved) but practical field experience (USAID/CAR and others) suggests that it is likely to take some time (two to five years) in developing to a point where it can be an effective regional policy formulation organization. It is anticipated that the need for a CAR energy market to be developed may drive the WEC process.
- Countries in the region are reluctant to sign and implement regional agreements related to water and energy. Other donors are focusing on bilateral and national solutions to water and energy problems. It is broadly recognized in the donor community that there is a need to work on multilateral, bilateral and national solutions, while recognizing the

current constraints on effective multilateral cooperation on key issues related to water and energy.

PRIORITY RECOMMENDATIONS

A major objective of USAID assistance has been to promote further cooperation between the countries of CAR, especially as they try to resolve the plethora of issues arising from their shared use of the waters of the Syr Darya and Amu Darya. Consistent with USAID's views, AEAI recognizes the importance of that objective, and it recommends that priority be given to that goal. It is important to note that many of the senior representatives of the CAR countries visited have expressed support for the 1998 Framework Agreement, as a basis for initiating negotiations under the WEC process.

AEAI recommends that the best vehicle to enable and empower the process of expanding/changing/replacing the 1998 Framework Agreement is through regional support of the CACO-sponsored WEC. USAID's collaboration/cooperation with the World Bank in establishing, organizing, and later operating the WEC is the highest priority assistance activity recommended in this report. The WEC initiative embodies enormous policy alignment possibilities for the Region, the potential for improved donor and IFI coordination and collaboration, and the potential for increased recognition at the highest levels in CAR governments. This is particularly true in USAID's involvement and considerable prior contribution to the establishment of such regional agreements and cooperation. As USAID works in alignment with other donors and IFIs in supporting the development of the WEC, WEC's role as a vehicle for regional cooperation in updating or replacing the 1998 Framework Agreement, whatever the CAR country driven process concludes, will further increase the effectiveness of the application of the USAID-provided targeted advisory assistance and coordination initiatives. This result can be expected because the USAID-funded effort will complement the commitment of resources from donor and IFI programs, and, thus, will enable USAID to leverage their prior experience and future financial assistance through the use of this forum for regional cooperation and collaboration. It is also recognized that although this strategy is logical and reasonable, practical experience in the politics of the CAR region leads to the expectation that the process of activation and realization for the WEC may take several years to bear fruit. Consequently, interim tactical actions should be taken (or in many cases continued) that keep USAID in a leadership position relative to this organization as well as responsive to the governmental representatives involved in the development of the WEC while maintaining its more practical technical (e.g. basin models, meteorological system), national (e.g. regulatory reform, privatization, energy market) and local level (e.g. water user groups, irrigation/monitoring system improvements) efforts.

AEAI recommends the prioritization of a number of possible USAID interventions in the energy sector. These recommendations support a vision that is held by many in the region that the eventual development of a regional energy market providing electricity at lowest possible prices within the framework of a competitive and sustainable process is of utmost importance to the region. Over the next five years this will require implementing a set of activities that will build incrementally on the emerging electricity market in Kazakhstan. On the process and technical assistance side this will require work on establishing professional energy regulators with "regionally" consistent rules and mechanisms for the countries to cooperate (at least bilaterally) on matter related to transmission, taxes, tariffs, market access, market design and ancillary services. It should be understood that USAID, working from this energy market focus, could, in fact, significantly enable the more politically focused WEC. In addition, this energy-oriented

approach would need to be well understood and assessed, as the energy first – lowest cost orientation of this approach has the potential to conflict the irrigation/water use needs of Uzbekistan, Turkmenistan, and Kazakhstan. On the infrastructure side the first intervention with the highest priority should be to provide support to measures that relieve the transmission congestion and constraints that currently exist on the 500 kV CAR Grid. Further grid expansion and development should be a priority for CAR. Consequently, USAID support to the completion of three proposed links is possibly most important step in helping to achieve this priority. The three tasks include the construction of:

- The 500 kV line—which is being proposed by Tajikistan to directly connect to the CAR Grid. This line is a priority solution toward resolving transmission problems in CAR. The line will allow Tajikistan to move power from generators in the south to loads in the north without having to use the transmission constrained Uzbek portion of the 500 kV CAR Grid.
- The second 500kV N-S line in Kazakhstan -- which is needed to stabilize the Grid and to provide more reliable access to Russian energy markets.
- A high voltage transmission link south to Afghanistan from Tajikistan in conjunction with the Tajikistan bypass link to the main CAR Grid will allow power trading into the Kazakhstan energy market from the large hydro facilities in southern Tajikistan without having to arrive at “mutual understandings” with Uzbekistan, and a North-South link to enable CAR energy trading to Afghanistan, Pakistan and Iran.
- Improved telecommunications infrastructure (SCADA) to link national dispatch centers (has potential to support other cooperative uses such as hydro-met, flood warnings, etc.)

As EBRD and ADB both have expressed interest in supporting these transmission efforts, USAID’s role would likely be that of facilitator and coordinator of these projects. Of these three priority projects, the high voltage linkage with Afghanistan is likely to be the most important to U.S. interests in the broader region. This is because the timely completion of this link will assist simultaneous U.S. assistance efforts in Afghanistan re-development by greatly reducing the cost of energy in Afghanistan after years of war and economic isolation, while also providing an attractive outlet for the output from the large hydroelectric generation projects being developed in southern Tajikistan.

A second USAID priority should be the provision of advisory support to the regulatory agency in Kazakhstan and, in general, the process that is underway in the Kyrgyz Republic to transfer electricity distribution to a concession or private ownership arrangement. Kazakhstan regulators have requested assistance from USAID in the design of a tariff policy framework that will result in increased investment by the private sector that enables them to upgrade and then maintain the condition of the country’s distribution system assets on a long-term basis. It is important to the CAR region that Kazakhstan successfully completes its reform process, thus reinforcing the resolve of other CAR countries to do the same

Somewhat similarly, in the Kyrgyz Republic the transfer of the distribution companies to concessions or private ownership arrangements - thereby resulting in a reconfiguration of incentives as compared to those that now exist for current public sector operators -- also seems to be the only way for the country to overcome its current problem of “theft” of electricity that subsequently result in low revenues and almost no new investment in electrical plant. Consequently, USAID should support the transition of Kyrgyz electrical distribution companies to new management in any way possible. The Kyrgyz Republic’s use of Toktogul storage in the energy security regime (generation over irrigation) is an issue in the region, and the

improvement of that situation will enhance prospects for cooperation among all CAR countries. Possible recommended areas for USAID intervention might include supporting increased efforts to:

- Assist in developing and reviewing distribution company privatization process plans, processes, and concession documents. Support public education on privatization,
- Reduce the winter peak load through programs supporting energy efficiency,
- Reduce un-metered energy,
- Improve metering in transmission and distribution,
- Expand public information and education programs that are targeted and designed to inform CAR parliamentarians and the general public of the benefits of privatization.

Finally, other priority AEAI recommendations for USAID to consider supporting in the CAR region include:

- Support for a uniform transmission services pricing methodology, thus establishing a policy from the beginning of the transition to a regional energy market that transparency is a fundamental principle,
- Provide policy and institutional technical assistance required as a component of a World Bank loan to Tajikistan to improve their electric distribution services.
- Assistance in the preparation of trading agreements, metering protocols, and other documents that will be required should the ADB PTRR loan be approved.
- Continued strengthening of USAID leadership in designing common donor strategies for the further development of the CAR water and power sectors, thus potentially leveraging the resources of the IFIs and other donors in support of USAID strategies.

1. FOREWORD AND BASIS OF THE ASSESSMENT



As a part of its process of assistance to developing countries, USAID periodically undertakes a review of current conditions in the countries in which assistance is being provided. Adjustments to existing programs and/or new programs may be initiated if warranted by changed conditions. The last such review of the transboundary water and energy situation in the Central Asian Republics (CAR) was called “An Assessment of Water Management in Central Asia and Recommendations for Future USAID/CAR Technical assistance.” It was prepared for the CAR USAID Mission in December 1999 by Vahid Alavian, Jack Keller, and Frederick Guymont. The results of that study provided guidance for the allocation of USAID assistance to the region for the period 2001 to 2005.

In anticipation of the end of the current phase of assistance and in order to design a next strategy for 2006-2010, USAID is currently engaged in an updating and re-examination of their program for the water and energy sectors in the CAR, especially of those components of the program that affect the region’s transboundary water and hydropower resources. Much has changed in the region since the year 2000.

Led by Kazakhstan, the countries of Central Asia, with the exception of Uzbekistan and Turkmenistan², are more clearly on a transition path from economies dominated by central

² Turkmenistan’s situation is not a subject of study for this Report.

control to those, which seek economic growth, based on individual enterprise. The seemingly chaotic changes that took place in 1996, when much of the electric plant in Kazakhstan was sold to private parties, has now begun to yield results. The country is moving to a condition where its goals of low-cost power based on sustainable private investment will be accomplished, thereby freeing government funds in the country for investment in other sectors of the economy. One result of the opening of the Kazakhstan electric sector, is that both the Kyrgyz Republic and Tajikistan are beginning to sell power into southern Kazakhstan and to the interconnected Russian electric system to the north. Besides purchasing power from sellers in the region, Russia (RAO UES) is also beginning to play an increasingly important role as prospective developer of new hydroelectric power projects in the region.

Developments in the water sector have not, however, been so favorable. The dispute between the CAR countries over the allocation of storage in the Toktogul Reservoir whether for power, irrigation or a blend of the two continues. The problem has been compounded by the incidence of large floods in the downstream reaches of the Syr Darya River during the winter season 2003-2004. Although progress is being made in improving irrigation infrastructure -- both by USAID in organizing farmers and demonstrating improved irrigation methods as well as by the World Bank and ADB with their large rehabilitation projects -- water wastage in irrigation continues to be very high and thereby leads to diminished output and low yields. Yet, even with these realities, recent developments give reason for hope of more rapid change. USAID on-farm efforts have demonstrated that with simple changes in irrigation techniques, significant increases in agriculture output can be achieved. Moreover, at a higher level, proposals to organize the Water and Energy Consortium (WEC) under the President-led Central Asian Cooperation Organization (CACO) give reason to anticipate progress in resolving the water disputes that have impeded development of the CAR countries since independence.

In summary, taking a look at the energy sector first, the beginnings of a wholesale energy market are clearly emerging, one in which the potential for low-cost power inherent in the region's energy endowment can be efficiently delivered to the benefit of all the region's residents. Prospects for the water sector, especially the resolution of the transboundary water disputes, are not so clear. The commitment of the highest levels of the CAR governments to Water Energy Consortium (WEC), along with their request for assistance from the World Bank, gives reason to hope that WEC will also eventually lead to the efficient use of the region's water resources, an outcome that will benefit all CAR residents. In this regard, an assessment by USAID that seeks to determine how it can best use its limited funds in the water and power sectors to further encourage these developments is timely.

1.1 Approach to the Work and Composition of the Team

As an initial step to begin the process of strategic planning for the next phase of assistance, it was determined that this review of USAID assistance to the region, should be conducted by an independent team constituted to assess current transboundary nexus of water and energy conditions including policies, practices, regional institutional capabilities, trends, and planned directions. Also included in the assessment need -- for the purpose of coordination of programs, -- was the review of development programs of other bilateral and multilateral institutions. Based on this review, a package of energy and water assistance activities could be defined that would best help the countries of Central Asia achieve water and energy rationality and sustainability.

To address the need to conduct this assessment of regional transboundary water and energy nexus, USAID/CAR issued a Task Order No. EPP-I-00-03-00004-00802 for "An Assessment

for USAID/CAR on the Transboundary Water and Energy Nexus in Central Asia” to Advanced Engineering Associates International (AEAI) under Energy II Indefinite Quantity Contract (IQC) to carry out this project. AEAi is a prime contractor for this Energy II IQC, and it uses Montgomery Watson Harza (MWH) as a subcontractor to assist in this project. This project started on September 30, 2004, and will conclude on January 31, 2005 (an extension from the original end date of December 31, 2004). The Statement of Work assigned to the assessment Team is given in Appendix A.

The goal of this assessment is to take a snapshot view of the current situation and identify critical development issues, and assess the level of involvement (ranging from not being involved to leading the effort), which USAID takes during the next phase of assistance. The assessment is be directed at the most important elements of the transboundary water and related energy issues in the Central Asian Republics. This assessment is limited to the two main transboundary river basins (Amu Darya and Syr Darya), which feed into the Aral Sea and their associated hydropower facilities. This assessment seeks to identify salient trends affecting the future of the sector - positive and negative aspects (in terms of improved regional cooperation) of recent policy decisions and actions affecting energy trading, regional agreements, irrigation water availability, and institutional developments. In addition, it examines the current activities and future plans of other donor agencies.

The AEAi Assessment Team consisted of three specialists. These specialists were: Mr. Peter Donalek (Senior Power Systems Studies Specialist, MWH), Mr. Richard Rudberg (Senior Water Resources Planning/Hydro Specialist, AEAi), and Ms. Olga Mandrugina (Energy & Environmental Policy Specialist and Project Manager/Coordinator, AEAi) who is a Russian native speaker. The AEAi Team implemented this assessment, in coordination with USAID/Washington, USAID/CAR Regional Mission and USAID/Country Representations staff and for most of the meetings, USAID staff members from USAID/Washington, CAR (including USAID country representatives) accompanied the Assessment Team at the meetings.

The Team held three days of pre-region travel information gathering meetings in Washington, DC in October 2004. The meetings included representatives of USAID/Washington and the World Bank to gain background and strategy perspectives from these key stakeholders. In the month of November 2004, the team visited four countries in the CAR region, starting with Kazakhstan and continuing on to the Kyrgyz Republic, Uzbekistan and Tajikistan. A total of over sixty (60) meetings were held with water and power officials of the four nations visited as well as with representatives of the donor agencies active in the water and power sectors. Information gained in the official meetings was supplemented with interviews with local private consultants who generally had extensive experience in the areas of water and power strategy and program implementation. In addition and prior to the visit to the CAR region, an extensive review was made of preexisting reports and other documentation relevant to the assignment. The review and analysis of this source documentation continued both during and after departure from the region and was augmented with materials collected during the meetings within the region.

This intense process of review, conducted in a relatively short time and centered on numerous meetings with key stakeholders in each of the four countries, resulted in a fresh and up-to-date view of the transboundary water and energy nexus issues constraining cooperation between the CAR countries. The process also provided information from which to judge the success of past and current interventions in the water and power sectors as well as insights into the processes and procedures that may be successful in the future in resolving the transboundary water and

energy conflicts. The problem of allocating the waters of the Syr Darya River in an efficient but fair manner is an enormously complex issue, involving four countries, all with equally strong but sometimes conflicting claims upon the water resource and its primary use. Although not as great a problem now, the Amu Darya could face equally severe conflicts in the allocation of its waters in the future.

In the report that follows attention has been given to reporting, where significant, the views of the water and energy officials, both from CAR governments and donor agencies that were interviewed. This involved interpreting, from a technical and strategic perspective for the purpose of future assistance programming by USAID, the significance of the various stakeholder viewpoints. Others with more experience in the geopolitics of the region may interpret the results and context of meetings differently, and, consequently, arrive at different conclusions. To mitigate this variance, cooperating country nationals (CCNs) with experience in the geopolitics of the region as well as in the technical water and energy nexus issues were contracted to clarify and interpret meeting notes collected by the Team and the USAID personnel who also attended these meetings.

1.2 Organization of the Report

The general content of the Final Report is defined in the Scope of Work (SOW) as comprising:

- (1) An understanding and assessment of the water and energy situation in the CAR countries, including policies, practices, regional institutional capabilities, trends, and planned directions;
- (2) An examination of the programs of USAID, other bilateral donors and International Finance Institutions (IFIs) in the water and energy sectors; and assessment of how future USAID assistance may be implemented in cooperation with these programs given our resource constraints, and
- (3) Recommendations to the Mission for a package of water and energy assistance activities, which leverage other donor resources and better enable the countries of Central Asia to achieve water and energy rationality and sustainability. Particular attention is to be given to answering 13 questions listed in the SOW and in AEAI Team work plan.

Consistent with the requirements of the SOW, this Report presents the assessment in a logical sequence of findings, proceeding from an understanding of the water and power situation to an inventory and evaluation of possible assistance activities, concluding with recommendations. This report does not attempt to duplicate the considerable technical analysis done for specific prior assessments (see Section 6 of this report for a list of references). Where references were quoted or data used from them for specific findings we have provided footnotes to this effect.

Executive Summary – Precedes the body of this Report and presents the summary of the findings and recommendations of this Assessment.

Section 1 – Foreword and Basis of the Assessment - discusses the basis of the study, approach to the work, and organization of the Final Report.

Section 2 - Introduction and Background - Following a general background review this section of the report provides a review of each country's policies, institutional capabilities, and trends and planned directions relevant to the utilization of transboundary water resources in the region. For the most part, information with respect to each country's situation, or set of existing

conditions with which it approaches the transboundary water and energy differences, was provided in meetings conducted in each country.

Section 3 - Issues, Constraints and Opportunities - Contains the presentation of the existing setting within each country and provides the basis for the discussion of the relevant issues, constraints, and opportunities. The importance of improving the efficiency of water use is highlighted, both by to maximizing the benefits that accrue from the allocation of water to different purposes, irrigation or hydropower, and also by improving the utilization of water use within each purpose.

Section 4 – Current Development Programs - Provides a review of past and current development programs of USAID and other donor agencies active in the water and power sectors in the CAR. The review includes assessments of the most significant programs of the donor agencies for the purpose, as required by the SOW, of improving the mutual effectiveness of assistance programs.

Section 5 - Recommendations for Future Assistance - Presents the Team's recommendations for future assistance activities by USAID. The recommendations are based on the evaluation of options derived from ongoing programs, and also the identification of new activities that have the potential to contribute in significant ways to the resolution of conflicts and realization of opportunities in the water and energy sectors of the region.

A series of supporting Sections and Appendices are provided following the main Report sections listed above. Most importantly, these Sections/Appendices include a listing of the officials and agencies visited during this Assessment.

The focus of this Report is to provide decision-makers with an assessment of the transboundary water and energy nexus situation in the region and demonstrate how USAID/CAR can make an effective and positive strategic contribution in the region and improve its visibility and status among other bilateral organizations, IFIs, and local regional stakeholders given the constraints of its limited resources.

2. INTRODUCTION AND BACKGROUND

2.1. Objective of the Assessment

The purpose of this assessment is to present an overview of the current situation related to the transboundary water and energy related issues of the Central Asian Republics (CAR). From this review and based upon input from key stakeholders, the report will identify critical development issues that remain to be addressed. This assessment and review are limited to the two main transboundary river basins (Amu Darya and Syr Darya) and their associated hydropower facilities. The final objective for this report is to identify and generally quantify possible USAID roles/opportunities for assistance to the transboundary water and energy sectors in the CAR. The opportunities are to be identified as a part of a process of review and evaluation of existing policies, institutions, ongoing assistance activities, and other factors relevant to the assessment of alternative options for intervention in the sectors. Possible constraints that may impinge on recommended interventions that could result in outcomes inferior to that anticipated are identified. In view of the limited resources anticipated to be available for future USAID assistance activities, particular attention is given to identifying possible cooperation opportunities with other bilateral donors, IFIs, and strategic investors in the CAR region.

2.2. Background: Water and Energy Nexus

For the Syr Darya and Amu Darya river basins studied within this report, geography defines the relative bargaining powers of the riparian states. By this distinction, the Kyrgyz Republic as the most upstream country on the Syr Darya has the potentially superior position on that river. The middle reach countries, Tajikistan and Uzbekistan, have more favorable locations, relative to water use, than Kazakhstan, the most downstream country on the river. However, given the large storage capacity of the Toktogul Reservoir, amounting to 19.5 MCM, all countries located downstream of that reservoir are in a potentially vulnerable position. Their vulnerability is compounded by the fact that the economies of the downstream countries, especially Uzbekistan, are dependent on the waters of the Syr Darya for irrigation of cotton and other high water use crops that in the case of Uzbekistan provide much of its earned foreign exchange. In contrast, the Kyrgyz Republic, with relatively little land area dependent on irrigation from the Syr Darya, sees its greatest advantage in using the Toktogul Reservoir for hydropower generation to meet peak internal energy demand in winter.

On the Amu Darya River, Tajikistan and Afghanistan are the most upstream countries with Uzbekistan and Turkmenistan in the downstream positions. However, although both Uzbekistan and Turkmenistan withdraw large quantities of water for irrigation from Amu Darya, storage in the upstream countries is currently minimal, thus reducing the likelihood of significant conflict between upstream and downstream countries relative to water discharge/use issues. This condition is likely to change in the future; Tajikistan has enormous potential for the development of hydropower resources, including large storage reservoirs. Two large hydro projects, Sangtuda and Rogun, have been proposed for development in Tajikistan within the next five to ten years. When completed, these two projects will provide Tajikistan a measure of control over the flows on the Amu Darya River -- a situation that can

lead to conflicts between water uses and users similar to those now evident in the Syr Darya Basin.

The Toktogul Project, located in the Kyrgyz Republic, was established during the Soviet period as an irrigation –storage-hydro-electric generation facility to store, over multiple years, surplus inflow in wet years for carryover to years of lower inflows when irrigation flow needs to be augmented downstream of the reservoir (vegetation season) to ensure that crop production achieved forecast/plan requirements. During the Soviet period, with the operation of the reservoir primarily for irrigation as intended, 75 percent of the annual releases from the reservoir were made in the summer months and the remainder in the winter season. Hydropower generation was a secondary benefit from the irrigation water flow of the reservoir. Power generated from the irrigation and water level control releases were utilized by Kyrgyz Republic to meet its electricity requirements, and any electricity surplus to their needs went to Kazakhstan and Uzbekistan. Fossil fuels were transferred from Kazakhstan and Uzbekistan to meet the heating and electricity needs of the Kyrgyz Republic when the reservoir was accumulating storage in the winter for later release for irrigation purposes in the vegetation season.

With independence, this centrally-managed communal arrangement fell apart. Each country faced a new set of incentives and constraints, and within the framework of expanded choice, the countries made choices to maximize their individual benefits. Most importantly, the Kyrgyz Republic began operating Toktogul primarily to meet their internal need for electric power (energy security) to augment or reduce the use of fossil fuel energy generation in the winter. The original irrigation focus of the project became the secondary use. Since the Kyrgyz Republic received little benefit from operation in the irrigation regime and all of the benefit when operating in an electricity generation focused regime, this shift of use profile for the Toktogul Reservoir was logical from the internal energy security point of view of the Kyrgyz Republic. However, it conflicted with the economic interests of the downstream countries especially, Uzbekistan and Kazakhstan. Presently, Kyrgyz electrical officials suggest a target for energy exports from Toktogul of 2.0 to 4.0 MkWh per year depending on inflow conditions. However, an even more important factor in the shift in emphasis to hydropower has been the rapid increase in demand for electricity in Kyrgyz Republic, especially in the winter season. Kyrgyz consumer electricity tariffs are set below the full cost recovery level (as in most CAR countries), but since alternative energy sources (oil, natural gas and coal) for winter heating must be imported, and consequently are priced at-market, this differential has greater impact on the consumer's choice for winter heating in the Kyrgyz Republic than in other CAR countries that have their own significant (price controllable) oil and natural gas supplies. The downstream countries recognize the change in conditions as a result of independence and have responded in their own way as described below. The new condition wherein the Toktogul operation is controlled by a separate sovereign state imposes a set of potential constraints on water availability not previously experienced.

To address the growing problems in the first half of the 1990's related to the management of the Toktogul Reservoir, the riparian states entered into a number of (ad hoc) annual agreements on water/energy exchanges in the Syr Darya River Basin. In 1996, the Heads of States asked ICKKU to place these agreements on a more formal footing. USAID/CAR provided technical assistance to high level ministerial delegations at various meetings and roundtables that led to the March 17, 1998 Framework Agreement between Kazakhstan, the Kyrgyz Republic, and Uzbekistan on the Use of Water and Energy Resources of the Syr Darya Basin. Tajikistan became a party to this Agreement on June 19, 1998.

The 1998 Agreement mentions that the BVO Syr Darya and UDC Energiya shall be appointed as executive bodies responsible for the release schedules and energy transfer prior to the establishment of the International Water and Energy Consortium (WEC) and its executive body. So far the operation and maintenance of the Toktogul Reservoir remains in hands of the energy generation company of the Kyrgyz Republic (JSC Electric Power Stations).

The 1998 Framework Agreement, brokered by USAID, was an attempt by the downstream countries to restore predictability and stability to the operation of the reservoir. This agreement worked for a while, but the downstream countries soon recognized that they could minimize their expenditures under the Framework Agreement, whether barter or monetary, and opted for annual negotiations wherein commitments to provide winter fuel to Kyrgyz Republic would depend on the annual need for water from Toktogul. The process of preparing and agreeing on annual bilateral and multilateral agreements has been cumbersome because they are time-consuming to conclude and can result in uncertainties. Technical discussions extend beyond the start of the vegetation season and agreements are finalized only by the middle of the season. This leads to uncertainties for the downstream farmers and to increased tension on both sides. Thus, in the last two years, when there was adequate water from sources downstream of the reservoir to meet irrigation needs, Uzbekistan has been able to minimize its irrigation-related obligations to the Kyrgyz Republic. The need for winter electricity in the Kyrgyz Republic does not, however, change according to the same pattern. Rather, the failure to receive, in barter or cash, fossil fuel from Uzbekistan and Kazakhstan necessitates an increased winter discharge from the Toktogul reservoir to meet Kyrgyz heating and electricity needs. This not only presents a threat to the adequacy of storage to meet irrigation needs in the following summer season, but also compounds the problem of winter flooding in the downstream countries. In the unusually wet years of 1999 – 2002, the downstream countries supplied less than the agreed quantities of compensatory fossil fuels, forcing the Kyrgyz Republic to increase winter releases. In 2001 a year of more normal water inflow for Toktogul and rain in the downstream countries, the Kyrgyz Republic released the agreed amount water in summer and Uzbekistan and Kazakhstan absorbed nearly all of the agreed volume of electricity exports by the former; however, Uzbekistan supplied less gas and Kazakhstan supplied less coal, ostensibly on account of transmission and privatization problems. Also, once the Kyrgyz Republic releases the agreed upon volume of water in summer and exports electricity, it must wait until the ensuing winter for the compensatory supply of fossil fuels with uncertainties relating to the quantity, quality, and price. The Kyrgyz Republic believes that it faces a major risk in this regard.

Although flood flows in the downstream reaches of the Syr Darya have occurred on an almost annual basis since independence, flooding was particularly severe in the winter season of 2003-04. Prior to independence, the maximum discharge from Toktogul in winter was 180 cms. The current discharge in November and December 2004 is reported to be substantially higher, nearing 600 cms (550 cms is the goal for the month of November in 2004 and in the period from December 2004 – March 2005 water release is not to be more than 600 cms per Protocol of the Session of Intragovernmental Working Group of Water and Energy Organizations to Regulate Cascade Regimes for Syr Darya Reservoirs, September 16, 2004). Although the incidence of flooding is again threatened, expectations are that it will be less severe than in the previous year due to compensatory actions/adjustments made by the downstream countries. The two reservoirs located downstream of Toktogul on the main stem of the river, Chardara and Kairakum, were both at full storage in 2003-2004 winter season

with little capability to store flood waters. In 2004, The Kyrgyz Republic and Kazakhstan are working closer together and Chardara storage is available to capture at least a portion of the flood flow. In addition, the capacity of the Arnasai Depression/Reservoir is reportedly increased and its structural features strengthened, thus permitting storage without the environmental damage that previously occurred. The intermediate storage reservoirs that Uzbekistan is reported to be constructing may also be close enough to completion to store excess flow for the 2004-2005 winter season. Finally, the hydraulic capacity of the channel downstream of Chardara Reservoir, where flooding was greatest in 2003-20004, has been increased under the World Bank Syr Darya Control and Northern Aral Sea Phase I Project.

The downstream countries are in the process of adjusting to higher winter discharges from the Toktogul in the Syr Darya, but the adequacy of irrigation supplies in the summer -- especially during drought periods -- remains an issue. The 1998 Framework Agreement was and arguably still is successful in providing a degree of stability to water releases for irrigation from Toktogul during years when the rainfall in downstream countries is normal. One respondent who was interviewed during the country visit to Kazakhstan suggested that the 1998 Agreement had been successful "in three out of six years." That simple characterization conveys the impression of most of those interviewed. In the view of most respondents, the 1998 Agreement represented, at the time, a breakthrough in getting the countries to work together and agree on an approach to the allocation of Toktogul storage that appeared feasible at the time. The role of USAID in brokering that Agreement is widely recognized and appreciated. One consequence of that success is that many of those interviewed urged a similar role for USAID in facilitating negotiations to improve upon the 1998 Framework Agreement.

As confirmed in the interviews, the 1998 Framework Agreement remains the signature agreement in the short transboundary water history of the CAR nations. Despite its imperfections, a checkered history of fulfillment of agreed commitments, and an absence of enforcement mechanisms, the Agreement endures. There is a sentiment, as noted in the interviews conducted in all of the CAR states that this Agreement should be continued, revised, strengthened and improved. Even Uzbekistan (representative of the Ministry of Foreign Affairs), a country that has not in the last two years attended the annual negotiations called for in the 1998 Agreement, declared in an interview with the assessment Team that the Agreement is "still in force and it works."

All CAR countries agree that new CAR realities, namely changes to market conditions, need to be incorporated in the revised 1998 Agreement. All CAR countries have their own expectations for revisions and extension of 1998 Framework Agreement.

As stated previously, all the signatories to the 1998 Framework Agreement currently have to enter into annual bilateral and/or multilateral agreements on water releases to compensate for the 1998 Agreement's general nature and limited applicability (covers water releases only for irrigation period). All the riparian states favor eliminating the need to have ad hoc annual agreements and would favor a revised 1998 agreement that incorporates more guidance on emergency situations (based on 1998-2004 experience in terms of unusually dry or unusually wet years and not based only on average numbers), summer and winter reservoir operations, adequate regime, proper control, monitoring and enforceability mechanisms to ensure sustainable cooperation in Syr Darya river basin.

2.3. Regional Institutional Background

There are several international organizations that are working on aspects of cooperation and alignment in the energy and water sectors in CAR. These organizations include: Interstate Commission for Water Coordination (ICWC), Central Asian Regional Economic Cooperation (CAREC), Central Asian Cooperation Organization (CACO), Eurasia Economic Community (EEC), and Shanghai Cooperation Organization (SCO).

Interstate Commission for Water Coordination (ICWC)- When the countries in the region gained independence, it became necessary to set up a mechanism for regional cooperation in the organization of water resource management. Based on the principle of equal rights and responsibilities, a number of agreements were signed to regulate cooperation in the joint management, protection and use of water resources.

The first was the Agreement on Cooperation Regarding Joint Management of Water Resources in Inter-State Water Sources. It established the ICWC representing the five Central Asian countries. It was signed in Almaty on 18 February 1992 and later endorsed by the Heads of State Decision of 23 March 1993. The operations of ICWC are regulated as follows:

- ICWC has five members appointed by the governments, who have equal rights and responsibilities with regard to joint consideration of national water supply issues, including environmental requirements. Decisions are by consensus.
- The two BVOs became executive bodies of ICWC, whereas part of the Central Asian Irrigation Institute (SANIIRI) was given the status of Scientific and Information Center (SIC) under the ICWC auspices.
- ICWC members represent their countries' interests within the responsibilities and powers delegated by their government.
- The principles of allocation approved in the USSR period should be retained until new regional and national water management strategies are developed and approved.

ICWC has the following functions:

- Development and coordination of annual consumption quotas for each country and principal water source, and operating regimes for large reservoirs; management of allocation based on actual water availability; establishment of annual supply volumes for estuaries and the Aral Sea, and discharges in rivers and canals; operation and maintenance of water abstraction facilities controlled by the Amu Darya BVO and the Syr Darya BVO ;
- Coordination of regional water management policy, development of its major aspects with due regard for public concerns and economic interests of the founding countries; securing sound use and protection of water resources; elaboration of programs aimed at increasing water availability in the region;
- Provision of recommendations to governments regarding their common pricing policy and compensation for possible losses from the joint use of water, and regarding the development of a legal basis of water use;

- Coordination in implementing large projects for the joint use of the existing water resource capacity;
- Establishment of a common information base on the status and use of water resources, monitoring of irrigated land and overall environmental monitoring;
- Coordination of joint research in scientific and technological support for regional water management programs;
- Coordination of the implementation of water conservation technologies, irrigation methods and procedures leading to improvements in irrigation systems and water use;
- Development of joint programs to increase awareness and prevent emergencies and natural disasters.

Later, in 1993, linked to the expansion of the Aral Sea Basin Programme (ASBP), two new organizations were set up to coordinate it: the Intergovernmental Council for the Aral Sea (ICAS)), and IFAS to accumulate and manage Program's funds. In 1997, these organizations underwent the following restructuring:

- ICAS and IFAS were merged into a new IFAS, with its chairmanship rotating biannually among the Presidents of the five countries;
- The IFAS Executive Committee (IFAS EC) was set up to provide the general management of ASBP.

BVO Amu Darya manages the water resource systems of the Pyandj, Vakhsh, and Kafirnigan Rivers and the Amu Darya from their sources to the Aral Sea. The assets under the control of the BVO include diversion facilities, hydro systems, interstate canals, and auxiliary facilities. All pumping stations located along the main stems of the rivers and the interstate canals are also under BVO control. However, the major diversions from the Amu Darya in Uzbekistan and Turkmenistan (Karakum Canal) are managed by the national ministries in charge of water management.

BVO Syr Darya controls the flow of the Naryn (below the Cascade), and the Karadarya, Chirchik, and Syr Darya down as far as Chardara reservoir. The Toktogul Reservoir is operated by the Kyrgyz power company. The BVO generally controls the diversion headworks for the main canals and a short adjacent length of the canal, except in the case of the Dustlik Canal which is under BVO control along its whole length.

Chardara reservoir and the section of the Syr Darya from the reservoir down to the Aral Sea, which are all situated in Kazakhstan, come under the control of the Aral Syr Darya BVO. This is a Kazakhstan government agency operating under the aegis of the Kazakhstan State Committee of Water Resources.

Every six months ICWC determines the operational modes of the Naryn-Syr Darya Cascade of reservoirs and the water shares of the countries for the vegetation and non-vegetation periods, subject to forecast water availability of the rivers. Decisions of the ICWC are implemented by the BVOs. The Scientific Information Center of ICWC (SIC-ICWC), set up in 1992, is an information and analytical center devoted to the improvement of water management and ecology in the Aral Sea Basin.

The **CAREC Program** seeks to promote economic growth and raise living standards in the region by encouraging economic cooperation. The operational strategy of the Program is to finance infrastructure projects and improve the policy environment for promoting cross-border activities in the areas of transport, trade, and energy. CAREC is sponsored by Asian Development Bank (ABD) and is described in Section 4.

The Interstate Council for Kazakhstan, Kyrgyz Republic, and Uzbekistan (ICKKU); was created in 1993 by the Heads of States. Tajikistan became a member in 1998. The organization was then renamed as the Central Asian Economic Community (CAEC). On December 28, 2001, the Heads of States decided to transform the CAEC into the **Central Asian Cooperation Organization (CACO)**. On February 28, 2002, CACO was set up and the rules established for its Executive Committee of National Coordinators. CACO covers economic, political and regional security issues. In particular, CACO deals with water and energy-related cooperation issues among the four Republics (Turkmenistan is not a member of CACO). Each of the member States nominates a high-level decision maker as national coordinator for developing strategies and plans for cooperation on the various issues.

The formation of the CACO, overseen by a Council of the Heads of States of four of the CAR countries for this purpose, is a clear indication of the importance they attach to the promotion of such cooperation. In his letter dated September 8, 2003, the President of Kazakhstan writing on behalf of all four Heads of State confirmed their intention to enhance regional cooperation in the above areas and inviting the World Bank to take the lead in assisting to set up the Water and Energy Consortium (WEC). The CACO now consists of Uzbekistan, Tajikistan, Kazakhstan, the Kyrgyz Republic, and as of October 2004 - Russia.

Water Energy Consortium (WEC) is the major regional effort to deal with transboundary river management issues, and it represents the best current opportunity to obtain full participation from all riparian states in developing or revising agreements governing transboundary rivers of the Aral Sea basin. Kazakhstan serves as the chair of this effort, and the World Bank has been designated by CACO as the lead donor for this subject. A working group has been established under the CACO to develop the concept of the Water Energy Consortium (WEC) and to submit it for consideration to the Heads of States of the CACO countries during the next meeting. Regardless of the efforts by Uzbekistan to develop additional irrigation storage capacity on its own territory in order to reduce its dependence on upstream neighbors, significant untapped net regional benefits can result from cooperation on water and energy management for the Syr Darya and other basins

Eurasia Economic Community (EEC, or EvraZes) is international economic organization, which is formed by five states – Belarus, Kazakhstan, the Kyrgyz Republic, Russia, and Tajikistan. EEC is a successor to Customs Union and was formed in accordance with UN principles and norms of international law.

EEC was created by an agreement of October 10, 2000 in Astana, KZ. In May 2002 Moldova and Ukraine received “observer” status in this organization. This agreement was created to assist the countries - members of the Custom Union - to create a united economic zone and coordinate its approaches to integration in the world economy and international trade system. One of the main directions of EEC activity is to ensure dynamic development of the Community by coordination of social and economic changes and effective use of countries’ economic potential - all in the interest of the increased well-being of the

population. There are committees of energy policy, transportation, customs, taxes, etc that were created under Integration Committee and work well.

EEC main goals are: (1) finalizing of free trade arrangement, design of unified customs tariff and a unified system to measure non-tariff regulation; (2) setting up of common rules of trade in goods and services and their access to the internal markets; (3) creation of unified currency regulation and currency control; (4) creation and implementation of joint programs of social and economic development; (5) creation of equal conditions for industrial and entrepreneurial activity; (6) creation of common market in transportation services and a common transportation system; (7) creation of common energy market; (8) creation of equal conditions for foreign investments; (9) provision of equal opportunities to citizens of the member states to receive medical assistance and education in the territories of all five countries; (10) harmonization of national legal systems; and (11) assurance of cooperation of legal systems of all member-states with the goal of a common legal zone in the EEC framework.

The main priorities of the EEC are transportation, energy, labor migration, and agriculture. In the energy sector the major thrust is joint development of hydro and energy complexes of Central Asia, solution of problems of energy and water supply, and development of a unified energy balance for EEC.

The EEC budget is formed on the basis of shares of contributions: 40% - Russian contribution; 20% - contribution from both Belarus and Kazakhstan; and 10% - contribution of Tajikistan and The Kyrgyz Republic, respectively.

According to Grigory Rapota, Secretary-General of EEC, the organization achieved some success in creation of a unified energy and transportation zone. Transit mechanism between states started working. In 2003 Tajikistan and Kyrgyz Republic transported to Russia through Kazakh and Uzbek grid more than 900 M KWh. Russia, together with Kyrgyz Republic and Kazakhstan, is preparing an updated feasibility study for the Kambarata Hydro Project. Based on the results of that study, the shares of each of the parties related to the project's implementation will be established.

Shanghai Cooperation Organization (SCO) was formed in 1996 as part of confidence building measures between China and the CIS states it bordered. Under the terms of the first agreement, all five countries were required to remove strategic warplanes, heavy armor, and some troops back 100 kilometers from the border. But China and Russia have also pushed the SCO to counter increased U.S. influence in Central Asia since the September 11 2001 terrorist attacks on United States, which subsequently led to U.S. troops deploying to the region in support of military operations in neighboring Afghanistan. The agreement on cooperation in trade, science and technology, and humanitarian projects was first approved in Beijing in September 2004.

The transboundary water and energy situation in each of the four CAR countries is described below. In accordance with the project SOW, emphasis is given to current policies and practices, institutional capabilities and trends, and planned directions, especially as they affect the transboundary water and related hydropower disputes. The interviews also focused on prospects for the development of a wholesale energy market for the Region, based on the success of reforms of the electrical sector in Kazakhstan and the growing interest of neighboring countries in exporting inexpensive hydropower to that market and beyond.

Where relevant, interview comments of government officials and donor representatives related to the transboundary water and energy market situations are highlighted.

2.4. Kazakhstan



The Assessment Team together with representatives from USAID conducted thirteen (13) interviews with officials of the Kazakh government and donor agencies located in Almaty and Astana. Interviews emphasized, above all, an assessment of the status of electrical system reform in Kazakhstan. The Country Manager of AES, a firm with 30 percent of the generation capacity in Kazakhstan, provided a view of reform from the perspective of the private sector. Other agencies interviewed in the electrical sector included the Kazakhstan Electric Grid Operating Company (KEGOC), Kazakhstan Operator of Electricity Market (KOREM), Anti-Monopoly Commission (AMC) and the EBRD Power and Energy Utilities Division. Among the water agencies contacted were the ICWC Scientific Information Center (SIC) and the Committee on Water Resources of the Ministry of Agriculture.

Policies and Practices. Kazakhstan supports the formation of the Water and Energy Consortium (WEC). With World Bank assistance, the draft documents describing the organizational structure and financial aspects are currently being completed. It is expected that WEC will become fully operational in 2005 ready to undertake resolution of the issues involving allocation of the Toktogul storage. According to the Kazakh Foreign Affairs representative, all four countries with interests in the Syr Darya River have agreed to revise the 1998 Agreement. Negotiations will take place within the framework of WEC. The 1998 Agreement and any progress made in the ADB-sponsored initiative to facilitate meetings between working group representatives from the involved countries will be taken into account. In entering negotiations, Kazakhstan supports the concept of economic benefit as a guiding principle. Reforms in Kazakhstan have had good results and are a demonstration to the region of their positive impacts, especially their value in bringing outside investment to a country.

Kazakhstan recognizes that the hydraulic works and irrigation infrastructure on the Syr Darya River are in a state of disrepair. Each country should contribute financially to the rehabilitation of the works, but it is recognized that some countries are not in a position to

make substantial contributions. Kazakhstan recognizes this and can afford to contribute more than others. The private sector may also be mobilized to assist with this problem. Once agreement is reached relative to Syr Darya, providing stability to the allocation of Toktogul storage, the countries will consider the issues related to the Amu Darya.

In a related development, Kazakhstan has experienced a migration of farmers from irrigated land areas in the lower reaches of Syr Darya below Chardara Reservoir. The same phenomenon is reported to be occurring in the lower reaches of the Talas and Chu River Basins bordering Kyrgyz Republic. Farmers are apparently leaving to take advantage of better economic prospects elsewhere in the country. Kazakhstan is reported to have no intention of attempting to repopulate the irrigated areas abandoned by farmers.

The deepening reform of the electrical sector will continue. It is anticipated that the day-ahead bidding process established by KOREM will determine the price of 30 percent of the electricity generated in the country next year. During the past year, the Kyrgyz Republic continued to sell Toktogul-generated electricity to Russia, transiting Kazakhstan, and also into the southern Kazakhstan market, thus advancing prospects for an eventual wholesale energy market in the region. Finally, efforts are being made to strengthen the regulatory process for electricity, especially to encourage greater private investment at the distribution level of the system.

Institutional Capabilities. The Water Resources Committee (WRC) of the Ministry of Agriculture is the main government agency responsible for overseeing the development and management of water resources in Kazakhstan. At the next lower level of the organization structure, eight Basin Water Authorities (BWAs), including one for Aral-Syr Darya, report to the WRC located in Astana. The BWAs are responsible for the operation of the water distribution system within their allotted territory of responsibility. WRC together with the BWAs is also responsible for all upgrade work. The Syr Darya Control and Northern Aral Sea Phase I Project, a World Bank project to upgrade infrastructure in the Aral Sea area, is under the supervision of the WRC.

The World Bank report for the Aral Sea Phase I Project characterizes the WRC as a “weak agency” in need of strengthening. Budget cuts in the last few years have depleted the capabilities of the agency. Nevertheless, according to the World Bank, “a core of capable technical staff remain in higher positions at all administrative levels.” The Deputy Chairman of WRC, in an interview with the Team, suggested that the period of declining budget allocations has ended and the WRC will see increases in funding in the future. The Aral Sea Phase I Project also includes support for strengthening of WRC. In that Project, currently under implementation, emphasis will be given to training of WRC staff in river basin management.

WRC emphasized the need for a management tool for the Lower Syr Darya River Basin, (expanded Decision Support System -- DSS) which has been proposed as additional task under Transboundary Water and Energy Project (TWEP)³ in its FY 2005 workplan (currently under review of USAID). The current DSS model provides this function for the middle Syr Darya river basin. The suggested extension of this model should also improve WRC capabilities for management of the irrigation supply system and flood control works below

³ TWEP is scheduled for completion on June 31, 2005

Chardara. Government guarantees of adequate funding for operation and maintenance of hydraulic works rehabilitated by the Aral Sea Project provides further support.

Kazakhstan began the process of reforming its electrical sector in 1996 by introducing private investment in the generation market. In 1997 the state utility was unbundled into generation, transmission, and distribution companies. System reform has evolved until the present time when all the generation capacity is privatized or owned by municipalities. A competitive market has emerged primarily based on bilateral contracts. On the distribution level there are twenty-one (21) Regional Electricity Companies (RECs) of which nine have been privatized. A more recent development is the emergence of a day-ahead trading pool for electricity under the management of the Kazakhstan Operator of Electricity Market (KOREM).

Electricity system reform has accomplished the objective of lowering rates for electricity but has not yet achieved a second objective of sustainability based on private investment. As one measure of investment need, technical and commercial losses at the distribution level range from 30-40 percent. Although poor management and deficiencies in metering likely account for much of the loss, run-down and aged distribution plant is regarded as responsible for a significant portion of the losses. Prices for electricity at the generation level are currently low, but they are expected to go up over time, as new plant is required to supply the growing demand. At the distribution level, allowable tariffs are fixed by the Anti-Monopoly Commission (AMC). A representative of the AMC, who is a senior technical manager in the organization, recognized that the industry is not getting sufficient private investment in the distribution network. A new tariff formula is being devised to allow higher rates of return for larger investments. The AMC representative recognized the possible need for a new methodology for setting tariffs. He inquired as to USAID willingness to provide assistance, perhaps by reviewing the experience of other countries in confronting similar problems. Of interest, the desirability of assistance to AMC was also mentioned by AES.

Kazakhstan Electricity Association (KEA) is a non-profit trade association with membership from companies active in the electric sector. KEA is an important spokesman for the industry and also conducts association-sponsored research to clarify issues for both the industry and government. KEA publishes a monthly Energy Industry Bulletin. KEA was formed on January 7, 1999. Association founders were the following companies: "Energoproject", "KazNIPIEnergoprom", "AES Silk Road Inc. in Kazakhstan", "Almaty Power Consolidated", "KEGOC", "Akmola REC", "Pavlodarenergoservis", "Kazzinc". Today KEA includes the majority of RECs, technical and market operators, large industrial customers, branch research and project institutes, domestic and foreign enterprises - power equipment producers, US Energy Association (USEA), power trading companies, international legal firms, etc. Total membership is thirty-four (34) companies and organizations. From the very beginning KEA worked in close cooperation with USAID and its NRMP program through PA Consulting and US Energy Association (USEA). International relations and cooperation have been established with the European Bank of Reconstruction and Development (EBRD) as well as with the Energy Regulators Regional Association (ERRA) branch of the National Association of Regulatory Utility Commissioners and World Energy Council (WEC). Within the framework of the USEA Partnership Program members of the Association had an opportunity to participate in study tours to the leading electricity companies and organizations as well as to federal agencies of the United States.

Trends and Planned Directions. In the mid-1990's, Kazakhstan adopted an aggressive strategy of reform of the electric sector, eventually evolving into today's generally privatized

electric system. Reform of the system will continue as evidenced by the emergence of KOREM to oversee the day-ahead bidding for the supply of electricity. Problems abound, however, especially in realizing adequate private investment to rehabilitate the distribution networks. AMC, the regulatory authority, is aware of the need to increase tariffs as a means to provide needed investment. Although the government has recently assumed control of AMC, the Team was assured that responsibility for the regulatory function has always been with the government and there will be little change. Continued government control of the regulatory body is not the optimal state. However, the senior manager of AMC was willing to recognize the problem of inadequate investment and, coupled with that, to discuss the possible need for an improvement in tariff policy.

In issues concerning water, the resolve expressed by representatives of the government in words was also shown in actions taken to facilitate a revised agreement relative to the Toktogul Reservoir and Syr Darya River. The initiative to create WEC is strongly supported by Kazakhstan. Instructions have been given to the water agencies of the government to cooperate in the formation of WEC. As the countries head into final discussions to establish WEC, cooperation with the Kyrgyz Republic also seems to be improved as compared with the conflict that existed between the countries as a result of the flooding downstream of the Chardara Reservoir in the 2003-04 winter season.

In terms of 1998 Framework agreement, Kazakhstan wants to renegotiate the agreement taking into account the body of international laws/rules on transboundary water use (i.e., Helsinki Rules on the Uses of the Waters in International Rivers). Extension of the Framework Agreement, in the opinion of Kazakh interviewees, should be based on the principles of feasibility and economic benefit.

In the debate between the “water” and “power” people in Kazakhstan, it seems the “power people” have won, at least for the time being. Rather than restricting energy sales to Russia and/or southern Kazakhstan (by a power swap regime versus an actual power exchange), the Kyrgyz Republic’s exports of Toktogul-generated energy have increased. Consequently, energy consumers in both Kazakhstan and Russia benefit from inexpensive hydropower. However, the increased discharges from Toktogul required to generate the power for export can have negative effects on the water sector - increased flooding in winter and depletion of storage that could otherwise be used for irrigation in the summer period. However, one such power export was done in order to avoid damage to the spillway when access runoff had to be discharged from a full Reservoir. In this case, the revenue from generation was “below cost” due to the fact that the customer had the leverage in the transaction. The Toktogul Reservoir is presently reported to be near full storage capacity and, as a result, the latter condition of inadequate irrigation water in summer 2005 does not appear to be a significant threat. However, flooding could still occur in reaches of the Syr Darya River below Chardara, although due to the Aral Sea Project improvements in carrying capacity of channels and other adjustments, the water authorities are better prepared this year to contain flooding than they were in the previous years.

2.5. The Kyrgyz Republic (Kyrgyzstan)



A total of sixteen (16) interviews were conducted in Bishkek, six with government officials and the remainder with donor agencies and a local consultant. The highest-level meeting was with the Vice Prime Minister in Charge of CAR relations. The remaining meetings with local agencies emphasized power. Valuable discussions were conducted with the entire range of agencies in the power sector, from the Genco (Electric Power Plants), Transco (National Electrical Grid), Disco (Severelectro, the distribution company for Bishkek) and the regulatory agency (State Energy Agency).

Policies and Practices. According to the Vice Prime Minister, the Kyrgyz Republic is still far from signing on to the WEC process. The stumbling block for the Kyrgyz seems to be the suggestion of other parties to transfer the operation of existing facilities (i.e., Toktogul) to WEC. The Vice Prime Minister insisted that this “will never happen.” On a more compromising note, he guaranteed delivery of adequate water from Toktogul under all hydrologic conditions, periods of low, high or normal flow conditions in the river, if the downstream countries on the Syr Darya agree to compensate the Kyrgyz Republic for the water services it provides. The Vice Prime Minister said that the Kyrgyz Republic, Kazakhstan and Tajikistan had decided to sign a new agreement (a revised version of 1998 agreement) for use of Toktogul, one not based solely on the 1998 Agreement but also taking into account international agreements made in other countries with transboundary rivers. The Minister stated that there are forty (40) such agreements in the world where downstream countries agree to compensate upstream countries for water services. He also indicated that discussions with Uzbekistan are underway but agreement has not been reached yet. It was at that point that he referred to possible help from a Special Representative from the U.S. State Department to help mediate the discussions. Another indication that the talks with Uzbekistan may not be going well was his statement that “water goes to Uzbekistan anyway,” recognizing their geographic position as a middle-reach state. It appears that Uzbekistan will remain an outlier, or free rider, receiving irrigation water without having to participate in inducements required to alter Kyrgyz operation of the Toktogul Project.

His (and other officials in the Kyrgyz power sector) strong support for the construction of the Kambarata I Project confirmed the statements in documentation that the Team had reviewed

prior to the visit to Kyrgyz Republic. Of interest, one official apparently struggling with the financial issues related to excessive wastage of electricity in distribution explicitly said, in reference to Kambarata, that control of losses has a higher priority.

The USAID task, conducted as a part TWEP, to assess electric losses in the distribution systems in the Kyrgyz Republic confirmed the seriousness of the electric losses problem and the urgency with which it needs to be addressed. As for the Kambarata Project, the Vice Prime Minister indicated that all future multi-purpose projects could be operated jointly by all the CAR countries through WEC. The Kambarata feasibility study, currently ongoing and funded by the Kyrgyz Republic, Russia and Kazakhstan, is focusing on how quickly the project can be built, according to the Vice Prime Minister.

The Kyrgyz Republic appears to view the EEC as the regional organization that best represents their interests. National working groups for revision of the 1998 Agreement are formed and work under the auspices of EEC. The Vice Prime Minister indicated that the Kyrgyz Republic would not take part in further meetings with ICWC. The feelings related to IFAS appear mixed—"it is not like it used to be." USAID re-involvement in the transboundary issues would be welcomed. USAID should lead the way in helping resolve water and power difficulties in CAR. According to the Minister, if USAID had not left the field following the 1998 Agreement, the Region would have made greater progress in the last few years⁴.

In terms of 1998 Framework agreement, the Kyrgyz Republic wants to extend and renegotiate participation based on its desire to be able to charge for water services and to change from a barter system to one of cash payment. It also supports an agreement renegotiation based on international laws/rules on transboundary water use. It was also emphasized that multilateral agreement is much better than bilateral arrangement due to the fact that the issue in question is complex and all the riparian states need reach consensus.

Institutional Capabilities. The Water Economy Department is responsible for the development and management of water resources in the Kyrgyz Republic. The country has slightly over 1.0 million hectares under irrigation, 60 percent of which is in the Chu and Talas river valleys. Only about 200,000 hectares of the Kyrgyz Republic's irrigated land area is in the Syr Darya river basin, mostly in the Fergana Valley. As in other CAR countries, greatest attention by the water officials is being given to the rehabilitation of irrigation infrastructure. The Deputy General Director of the Water Economy Department indicated that 360,000 hectares scattered throughout the country, twice the amount that had originally been programmed for improvement, had been rehabilitated under a \$35.0 million loan from the World Bank.

After several years of preparation, the Kyrgyz Republic's electrical sector was unbundled in 2001 with the formation of seven separate entities, a generation company, a transmission company, and five distribution companies, one of which is for heating alone. The pre-privatization reorganization of SeverElectro (one of the Discos) into a joint stock company has been done in readiness for operation in the concessionaire mode of privatization. The Legislative Assembly, lower chamber of parliament, passed amendments to the country's law on concessions. Under the amendments, parliamentary approval is required for concession

⁴ Deputy Prime Minister's understanding was that USAID stopped its involvement in CAR after 1998 Framework Agreement was signed, in fact, USAID did not leave, it shifted its involvement from policy-related issues to targeted demonstration projects – further discussion is in Section 4.

arrangements for facilities of strategic significance. Much debate has occurred due in part to a lack of understanding on the part of the public, NGOs, parliamentarians, and the political parties on the subject of privatization and concessions in that context. Several deputies proposed that a national referendum should be held to resolve the issue concerning privatization of the gas industry and energy sector. In addition, parliamentarians are averse to passing controversial laws in general and some are concerned about the transparency of the process of selection of the potential concessionaire.

The Team visited the Genco (Electric Power Stations), Transco (National Electric Grid of the Kyrgyz Republic) and one Disco (SeverElectro). Discussions at the Electric Power Plants Company, confirmed the cooperative relationship between the Kyrgyz Republic and Kazakhstan that currently exists, and the differences of opinion between the “water” and “power” people in Kazakhstan that is discussed above. According to the Director General, Electric Power Plants, the Kazakh water official’s goal is to avoid floods in the winter, but this constrains hydroelectric production from Toktogul in that same season. The two countries are coordinating operations more closely this year to avoid a conflict over this issue. The Tajik’s are regarded as uncooperative by keeping the Kairakum reservoir full during the winter, apparently to generate power with maximum head.

The Director General volunteered his perception that CAR is progressing to a unified electric market, stating that “in a certain time period, all will be able to achieve this free market.” He asserted that customers in southern Kazakhstan want “our cheap electricity.” The power company has a five-year agreement with Russia for sales up to 1.5 Bkwh per year. The high level of technical and, especially, commercial losses by the distribution companies continues to be a major problem. As one consequence, for example, the Genco receives payment for only 70 percent of the energy delivered to the distribution companies.

The Director General, National Grid of the Kyrgyz Republic, expressed much the same concern about losses in distribution. The Disco’s currently owe the transmission company \$40 million. The amount is uncollectible due to high technical and commercial losses in distribution, estimated to be as high as 40 percent. In contrast, the transmission company has a comprehensive program of reducing technical losses (commercial losses do not exist for the transmission company), which have declined from 10.15 percent in 2000 to 6.7 percent in 2004. The major remaining technical problem for the National Grid Company is the limited capacity of the transmission line through Fergana Valley due to a “high workload.” Building on its relationship with Russia, the Director General indicated that the company has plans to complete a line to the south to enable supply of power to the aluminum plant owned by the Russians (Russian Aluminum). According to the Director General, export of power is not a problem. The CAR countries have rules for the export of power by which they all abide. Currently, the Kyrgyz Republic has direct contracts for supply of power with Kazakhstan and Russia and the process of delivery of the contracted energy is completed by the control center in Tashkent. Exports are expected to be 2.0-4.0 BkWh per year and increase to 10.0 BkWh when the Kambarata I Hydro Project comes on line.

The Commercial Director of SeverElectro stated that the losses in distribution are the same as they were prior to restructuring of the utility in 2001. However, since the profits were reported by the unified company that existed at the time, the high losses in distribution were not so apparent. For the future, privatization of the distribution companies is the answer, according to the Commercial Director. He has visited privately owned and operated distribution companies in Kazakhstan and has observed that losses are under control, at least

relative to the level of losses experienced in the Kyrgyz Republic. The Commercial Director credited the ongoing USAID study of losses in distribution as convincing him and others at SeverElectro that electricity losses due to “theft” are much greater than previously thought. “We will change our methods of work by analyzing this project.” Moreover, according to the Director, “USAID has pioneered in the transition to electronic meters.” However, when asked if the research would be continued to monitor progress and provide additional insights as to sources of loss, the Director indicated no such plans; rather the meters being provided as a part of the \$5.0 million World Bank loan will be installed in scattered locations. Indeed, the need for improved meters to reduce theft of electricity is huge. There are 500,000 accounts, or separate customers for electricity in the country, 200,000 of which are in the Bishkek service area. It will cost an estimated \$25 million just to replace all meters in the Bishkek service area.

The Disco’s also experience high technical losses, estimated to be about 16 percent as compared with 24 percent for commercial losses, which is no surprise since most of the distribution equipment -- transformers, meters and lines -- date back to the Soviet times. Little renovation has taken place due to lack of funds. Due largely to the heating load, consumption of electricity is 3-4 times higher in winter than summer, with the result that the company is in crisis every winter due to interruptions in service from overloaded transformers. Increases in revenue collections would help this situation. The Commercial Director stated, in fact, that while nearly 100 percent of amounts billed are collected, the collections are often in barter or, if from another government agency, in offset services, both of which complicate the problem of raising revenues. But the greater problem is the unbilled electricity resulting from special deals between consumers and meter readers. One interviewee told the Team that whenever the meter reader showed up in their village outside of Bishkek, the leaders of the village would negotiate a reduction in the meter reading with the result that full payment was made but for a significantly lower amount of electricity than actually used. Based on the level of unaccounted electricity usage, the practice of negotiated billings must be extensive.

The Director or the State Energy Agency, which has the responsibility for regulating the power industry, explained that their responsibilities are quite sweeping -- extending from granting licenses for generation and distribution of electricity and natural gas to setting tariffs and approving typical contracts. The Agency’s budget, derived from government sources, is not consistent with these extensive responsibilities. Fortunately, this condition could change in the future should the draft law be approved by parliament because that law allows funds for Agency operations to be collected from companies active in the electric sector. Until that happens, or some other source of funding is found, the State Energy Agency will be seriously handicapped by a lack of adequate funding.

Trends and Planned Directions. The Kyrgyz Republic’s strategy, at least in the water and power sectors, is based on the capitalization of its advantageous position as the most upstream state on Syr Darya, with a large storage facility under its control. To the Team’s knowledge, no state has gone to war simply because of water disputes and so, by reason of geography, the Kyrgyz Republic is in an excellent position to maintain its strategy, components of which seem to include:

1. Sell energy surplus to its own needs into the Kazakhstan and Russian markets, thus earning foreign exchange. Along with this comes the potential longer term advantage

- that accrues from participation by the Kyrgyz Republic, a country with cheap hydropower, in the regional energy market;
2. Insist on compensation for Toktogul water services. The precise terms of compensation for storage are not clear, perhaps not even to the Kyrgyz at this point, but one respondent estimated it should be a three-level tariff based on storage, electric charges and O&M;
 3. Maintain membership in the EEC, cementing relationships with Russia and the CAR countries that are members of EEC. The preliminary agreement between the Kyrgyz Republic, Kazakhstan and Tajikistan, based on international guidelines for utilization of transboundary rivers, appears to be an outgrowth of discussions in the EEC forum;
 4. Recognize the huge problem that the losses in electric distribution represent and continue to work toward the privatization of the distribution networks as the solution to that problem; and
 5. Continue to press for the construction of Kambarata I multi-purpose reservoir project, both for purposes of increasing exports of hydropower into the CAR market as well as other countries, and as a contribution to resolving the transboundary water and energy problem on the Syr Darya River.

Although the initial reaction of the Kyrgyz Republic to WEC has been tepid, at least as conveyed to the Team by the Deputy Prime Minister, the country's participation in WEC, at least in its initial stages, would not seem to be in conflict with any of the foregoing strategic directions.

2.6. Uzbekistan



The Team conducted sixteen interviews in Uzbekistan and made a field trip to the BVO Amu Darya in Urgench and irrigation command areas served from the Amu Darya River. The interviews in Tashkent were evenly divided between government agencies and donors.

Policies and Practices. The Ministry of Foreign Affairs of Uzbekistan made a statement supporting the 1998 Framework Agreement. The 1998 Agreement is “still in force and it works” according to the representative from Ministry of Foreign Affairs. Uzbekistan has not attended the annual negotiations as called for in the 1998 Agreement for the last two years.

Nevertheless, it was suggested that negotiations between countries, conducted within the framework of WEC, would be initiated using the 1998 Agreement as the base document to be improved. Additionally, Uzbekistan favors construction of re-regulating structures downstream on its own territories to mitigate winter water discharges from the Toktogul, to ensure adequate irrigation supplies to their own agricultural assets, and to lessen dependence on other countries, especially the Kyrgyz Republic's Toktogul operations.

Uzbekistan supports WEC; indeed, the proposal for a WEC was originally made by Uzbekistan in the 1990's. As for the status of WEC, the Foreign Affairs spokesman said that the draft document describing what kind of issues it should resolve was approved in October. It is the "philosophy" according to the spokesman, and now the countries face implementation. Since nearly all government officials encountered in Uzbekistan indicated a policy of returning Toktogul to the irrigation mode of operation, it is unclear how implementation will proceed.

The Foreign Affairs representative maintained that Uzbekistan has surplus energy and therefore can export electricity to Afghanistan. The proposition that Uzbekistan has surplus energy is questionable, but it seems that in both the cases of Uzbekistan and Tajikistan, the authorities may be willing to dump load within their own countries to supply power to Afghanistan. The representative of Foreign Affairs indicated that Uzbekistan is awaiting developments with respect to the major hydro projects -- Sangtuda, Rogun and Kambarata. The Unified Dispatch Center (UDC) in Tashkent will be in the middle of any subsequent developments.

The history of the Power Trade Relations Agreement (PTRA) is also of interest as to what it suggests about Uzbekistan policy. At the time of the Team's visit to the CAR, the \$90 million ADB loan for improvement in transmission infrastructure in Uzbekistan and Tajikistan had been pending for two years, apparently held up by Uzbekistan failure to agree to conditions associated with the loan. The ADB, with the assistance of USAID through the NRMP contract, designed the loan documents for PTRA to include provisions that would allow Tajikistan to more readily export its surplus hydropower through Uzbekistan. The provision, called "open access" is intended to facilitate energy trading in the CAR as well as better utilization of hydropower energy. Based on their reluctance to sign the loan documents, it appears that Uzbekistan policy does not support the loan conditions. As the Team found during their later visit to Tajikistan, the Tajik power company, Barki Tojik, is purchasing right-of-way and has under design their own open access solution, a 500 Kv line that interconnects with the CAR 500Kv Grid outside of Uzbekistan.

On a working group project, the ADB with USAID assistance, designed a technical assistance project intended to initiate negotiations between the countries that could help lead to a resolution of conflicts over use of Toktogul storage. The project called for the formation of working groups by four countries with interest in the matter, followed by joint meetings between the groups to consider each country's recommendation. One of the useful outcomes of the process would be a set of agreed rules for operation of Toktogul. An outline of possible rules has been prepared by NRMP and if not applicable within the context of the ADB TA, would be applicable to discussions within the framework of WEC. Although Kazakhstan and the Kyrgyz Republic nominated working groups of a level judged adequate to conduct serious negotiations, the same was not the case for Uzbekistan, which sent lower level representation. Tajikistan had not proposed any members to their working group at the time of the Team's visit to CAR. As Dr. Dukhovny, Director of SIC - ICWC in Tashkent related,,

the government has asked for “more detail” as to the reasons higher-level members of the working groups are required. It appears that Uzbekistan prefers, as suggested by the Foreign Affairs representative, to negotiate at the higher level of CACO and WEC, with support from the World Bank as the lead donor agency. As Dr. Dukhovny related to the Team, the recent World Bank report is “consistent with Uzbek opinion.”

In a recent development, the Country Manager of the World Bank said that the Bank had decided to reduce lending to the irrigation sector in Uzbekistan. Macroeconomic conditions in Uzbekistan are not healthy. Economic activity in Tashkent did not appear nearly as robust as in other cities (Almaty, Astana, Bishkek and Dushanbe) visited. Uzbekistan’s economic policy of import substitution coupled with slow reform does not appear to be producing results. Consideration should be given to changing this policy, especially since it is beginning to affect the availability of resources to upgrade irrigation works and other important inputs for increased output from the agricultural sector. That sector provides employment for nearly half the working population in Uzbekistan and earns a major portion of the foreign exchange. Perhaps in time, policies will change resulting in greater openness to trade and cooperation with neighboring countries. Evidence of marginal reform, or at least preparation for reform in the energy sector (creation of joint stock companies), was evident but did not indicate significant change in policies in the near future.

Institutional Capabilities. BVO Syr Darya, nominally the Regional organization responsible for management of the Syr Darya River, has its headquarters in Tashkent. The BVO reports to the ICWC but in the absence of consensus among the countries at that level (a frequent occurrence) the Head, BVO “regulates at my discretion.” In practice, the BVO manages water allocations in the Uzbek portion of the river, the reach that serves some 2.0 million hectares of irrigated land, far more than in other countries through which the Syr Darya flows. The DSS, developed as a part of TWEP, is intended to assist the BVO in management of water requirements and allocations.

Also in the water sector, the Team visited the offices of Uzhydromet and SIC ICWC. The Head, Uzhydromet said that his main problem is the absence of data from the most upstream countries, the Kyrgyz Republic and Tajikistan. Without this data, it is difficult to prepare accurate forecasts of river discharge. Sharing of data between agencies, even within Uzbekistan, is another problem. The Swiss Agency for Development and Cooperation (SDC) in Bishkek indicated that the Swiss may not go on to Stage II of their hydrologic and meteorological data collection program because of lack of information exchange. However, by the time the Team reached Tajikistan, the SDC office in that country reported that the Swiss had decided to go forward with Stage II.

At the office of SIC ICWC, Dr Dukhovny presented a series of opinions on the current situation as seen from the SIC ICWC point of view. Of possibly most significance, Dr. Dukhovny stated his position against the 1998 Framework Agreement and the mixing of water and power, implying that he never would support an agreement that recognizes the two purposes. Modeling specialists at SIC demonstrated the operation of an optimization model developed for the Syr Darya, probably derived, at least in part, from the modeling work that USAID supported in the 1990s. The model may be adapted further to provide insights that will assist in negotiations of a new agreement for Toktogul and the Syr Darya River.

On a visit to Urgench, the Chief, BVO Amu Darya said that in most years, irrigation is ample for the needs in the Uzbek command areas served by the Amu Darya. Once every 3-4

years, however, by estimation of the Chief, BVO Amu Darya, water shortages do occur. In those years, a Commission is appointed for the purpose of allocating the shortages. According to water specialists from the BVO, there has never been a situation where the Commission has not been able to work out, with the apparent assent of the irrigators, a distribution of the water shortages. The BVO has extensive responsibilities for water management, extending from allocation of water among intakes to maintenance of main and secondary canals and access roads. The Team was shown a command area proposed for canal automation similar to one that was completed for the Pakhtaabad Canal in the Syr Darya river basin.

Institutional capacities and directions in the electrical sector were assessed in an interview with staff of Uzbekenergo, a joint stock company that reports to the government. The spokesman estimated that Uzbekistan had sufficient generation capacity to meet the country's needs although there is a need to obtain peaking power from Kyrgyz hydro (sometimes from Tajik hydro) in the evening with the energy returned later that night, presumably from thermal. Periodic short blackouts in Urgench suggest the possibility that Uzbekenergo is dumping local load to partially fulfill their commitment to the hydro countries. Moreover, it appears that the exchange is a simple one-to-one swap, not taking into account the typical difference in values between peaking and night-time energy. A regional marketing pool, generators bidding into the pool to supply the more valuable on-peak power, would change such practices.

The Head of the Economy and Finance Department of Uzbekenergo told the Team that the government made the decision in 2001 to establish, in due course, an energy market in Uzbekistan. All institutions including some of the largest thermal plants are being organized into joint stock companies. The experience of Kazakhstan with privatization of generation and the creation of an energy market is being closely watched. So far, according to the economic and finance specialist of Uzbekenergo, prices for electricity has declined in Kazakhstan but the level of tariffs is inadequate to justify investment in rehabilitated or new generation. The financial specialist expects prices to eventually go up to the level of prices in Uzbekistan. Until that point, Uzbek power plants are not competitive. If Uzbekistan entered a Regional energy market, the Uzbeks would be buyers.

Uzbekistan's program to update all electric meters is reassuring in view of the electric losses experienced by other countries of the region. The goal is to replace all electric meters with modern designs by 2008. For that purpose, eight different designs from various countries are being tested in pilot projects. It is intended that a joint venture between Uzbekistan and China will produce the selected meter from those tested.

Trends and Planned Directions. Although some have indicated that there is reason to believe that Uzbekistan is at the point of changing policies, possibly becoming more cooperative with other CAR countries, the Team concluded that this is unlikely, at least in the near future. One member of the donor community stated that they have no idea why Uzbekistan follows a policy of isolation. In that interviewee's opinion, it is clearly not good for the well-being of the citizens of Uzbekistan, or for the region in its efforts to cooperate for the benefit of all CAR countries. Indeed, experience from other transboundary rivers has shown that it is in the interest of countries to cooperate in the use and development of their common water resources rather than engage in protracted disputes. Yet, the evidence seems clear that Uzbekistan has not reached a point of changing directions. An analysis prepared by World Bank economists in 2000 provides legitimacy to the Uzbekistan strategy of slow

reform, import substitution and energy and food grain self-sufficiency⁵. The paper compares Uzbekistan's strategy of slow reform to Kazakhstan's rapid change and concludes that while "Kazakhstan's policy performance is definitely superior, economic performance is not so." Although four years have now passed since that paper was written and the evidence is now in, officials in Uzbekistan hold to the belief that slow reform is better. For example, it was pointed out to the team that Uzbekistan does not want to endure the chaos that ensued from the privatization of energy assets that took place in Kazakhstan in 1996- 1997.

Uzbekistan will continue to support the 1998 Framework Agreement as the basis for negotiations under WEC. From the Uzbek perspective, as a middle-reach state that the Kyrgyz said "receive the water anyway," it provides for annual agreements; and with the support of Kazakhstan, which is in an even more disadvantageous position as the tail-end state, Uzbekistan will be able to negotiate for the release of Toktogul water during drought periods. Thus, they get the water when they need it and save on compensation to the Kyrgyz Republic in other years. Of course, they are assuming that water will be available in Toktogul when the drought occurs. Technical analysis within the WEC process needs to demonstrate to Uzbekistan that even greater benefits will accrue to them from cooperation with other countries in the management and future development of the resources of the Basin. But the need to cooperate will have to be proven in a process of analysis and persuasion.

As for the power sector, in the near term, Uzbekistan will continue its policy of very slow reform, creating joint stock companies and having a semblance of competition but avoiding imports that require significant payment of scarce foreign exchange. However, over time, it is expected that the country will realize their comparative advantage, whether industrial production, services, or diversified agriculture to supplement cotton. The plan to test, manufacture, and install electronic meters to measure electric usage by all customers, if realized, is a model for the region and is an example of where Uzbekistan's comparative advantage may lie.

2.7. Tajikistan



⁵ Asad Alsm, Arup Banerji, "Uzbekistan and Kazakhstan: A Tale of Two Transition Paths", World Bank, Europe and Central Asia Region, Poverty Reduction and Economic Management Sector Unit, 2000

A total of twelve (12) interviews were conducted in Tajikistan. Among those visited were the Minister of Energy, Minister of Improvement and Water Economy and the Deputy Minister, Foreign Affairs who also currently serves as Chairman of IFAS. A representative of Pamir Energy, a company providing electric generation and distribution in eastern Tajikistan and the only public/ private company encountered by the Team, described the structure and financing of Pamir. The Tajikistan public/private approach, combining private sector incentives with public sector financing, represents a possible development model that could be utilized more extensively in the CAR.

Policies and Practices. Tajikistan is said to have 140,000 MW of undeveloped hydroelectric capacity, a resource condition that underlies Tajikistan policy positions. In the longer term, the country sees itself, quite reasonably, as the provider of cheap hydropower for not only CAR, but also Afghanistan, Pakistan, Iran, Western China, and Russia. In an effort to make this vision a reality, Tajikistan is inviting neighboring countries to look to Tajikistan hydro projects as an alternative to investments in more costly generation projects in their own countries. Based on this proposition, the neighboring countries are being asked to invest in Tajik hydro projects. For the shorter term, emphasis is being given to completion of the Sangtuda (670 Mw) and Rogun (3600 Mw) hydropower projects. When asked when these projects would be completed, representatives from Barki Tojik, the generation company, insisted on three years for the former and five years for the latter. Although these estimates appear optimistic, the Team believes these projects will be completed in the intermediate term and will begin the transition of Tajikistan to the realization of its perceived long-term role in Central Asia.

In the current situation, power is reported to be in short supply, especially in winter when river discharges for hydro generation are at their lowest levels. The existing Nurek Hydroelectric Project, which is the largest of the hydro projects in Tajikistan, does not have adequate storage capacity to carry water over to meet the winter season demand for power. In contrast, in the summer season when flows are high, Nurek has the capacity to generate energy surplus to Tajik needs but is constrained by lack of market and/or by technical, financial, and, possibly, political factors. In spite of the low cost of hydro energy, Uzbekistan is reluctant to take all the electricity available from Tajikistan in the summer because of the need to replace the energy in the winter when Uzbekistan supplies are inadequate. Moreover, importing significant amounts of electricity from Tajikistan would be inconsistent with the Uzbek strategy of energy independence.

Tajikistan has been able to negotiate a deal to sell their surplus energy to Russia, or rather likely to southern Kazakhstan in a swap for energy delivered to Russia from generators in northern Kazakhstan. However, due to congestion on the overworked section of the 500 kV Grid in Fergana Valley or, as related by Barki Tojik, financial tariffs assessed by the Uzbeks for transit on their portion of the Grid, the contract with the Russians could not be fulfilled, and the water that could have provided inexpensive power to fuel development was wasted. One interviewee estimated that, on average, 1.5 Bkwh per year goes over the spillway at Nurek as wasted energy. Yet another reason for this wastage was advanced by the Uzbeks; the Kyrgyz captured the market in Kazakhstan and there was no room for the Tajiks, perhaps on the Grid as well as within the market.

Whatever the reason, Barki Tojik is resolved to free itself of these constraints. As related above in the discussion on Uzbekistan, it has under design and is purchasing the right-of-way for a 500 kV transmission connection to the Grid that bypasses Uzbekistan. As the Deputy

Foreign Minister said, “in transmission, we have a big problem with Uzbekistan.” Once the line is completed, it may not be so necessary to negotiate “mutual understandings” which is apparently the present Tajik strategy for dealing with the problem. Barki Tojik said that no progress had been made in the recent negotiations, conducted in Tashkent, directed to resolving differences on PTRAs (and open access). The Deputy Foreign Minister simply said that we hope we will come to agreement with Uzbekistan on PTRAs in the near future.

Reform of the electric sector is in its initial stages in Tajikistan. In accordance with the common practice, the pre-existing utility company has been unbundled to form a Genco (Barki Tojik), Transco, and some 15 Discos in charge of the distribution function. All have apparently been organized as Joint Stock Companies, but all continue, for the time being, to report to the government. The government is reported to have made commitments to the World Bank to complete the reform and privatization process in the electrical sector.

Tajikistan supports WEC and is ready to redesign the 1998 Agreement to incorporate better mechanisms for “control and monitoring” of agreements reached in annual negotiations. Tajikistan suggests that Amu Darya as well as Syr Darya basin should be included in the revised agreement. Overall, Tajikistan does not believe that the current Framework Agreement addresses Tajikistan’s issues as much as it addresses those of other countries. The Deputy Foreign Minister, who also serves as Director of IFAS, said that an application had been made to the ADB to help in reconsidering the 1998 Agreement, and the approach of working groups from each country, described above, was developed. Nevertheless, if the discussions concerning the modification of the 1998 Agreement go forward under WEC, the Deputy Minister wearing his other hat suggested that IFAS, representing all five countries, be considered for a possible role, probably relevant to discussions involving the Amu Darya River Basin. The Deputy Minister offered his view that WEC is crucial for the creation of an energy market for the region.

Rehabilitation of irrigation infrastructure, which deteriorated in the turmoil that accompanied the transition from Soviet times followed by the civil war, remains a major government strategy. The Minister of Improvement and Water Economy said that altogether Tajikistan has 720,000 hectares of irrigated land (of which 250,000 is in the Syr Darya River Basin and the remainder in the Amu Darya Basin), 40 percent of which is irrigated by pump irrigation. Another source indicated that 60-70 percent of the land is irrigated by pumps. The Ministry charges for water but payments are a fraction of the assessment. The goal is to increase collections to 60 percent of the assessment this year. As proof of the success of the program to rehabilitate irrigation infrastructure, the Minister pointed to three rayons where production had doubled following the rehabilitation of irrigation works and improved water supply.

Institutional Capabilities. Tajikistan is following the standard model for increasing agricultural output, rehabilitation of irrigation infrastructure coupled with the formation of irrigation associations, or water user groups. Legislation enabling the creation of water user associations is pending. Irrigation experts working as part of the USAID assistance program indicate that farmers are looking for help and readily cooperate in the organization of the associations.

One objective of the USAID WUASP project is to demonstrate a proven approach to sustainability of water user organizations, following the experience of the Philippines, Turkey and other countries with successful programs. Water charges, important to sustainability of irrigation works, are beginning to be assessed on Tajik farmers. But a major problem,

seemingly unique to Tajikistan, is the level of private debt that is owed by the average farmer to investors. In contrast to farmers who are not in debt and can sell their crops on the open market for higher prices, the majority of the farmers, struggling under debt, market their output through restricted channels, receive low prices and are not well off. The ADB is taking the lead in trying to solve this problem by helping farmers work off their debt.

As a result of the interviews with energy sector officials, the Team took particular note of two impressive features. One was the responsiveness of the staff of Barki Tojik, with whom the Team met and discussed the current situation and plans for development of the electrical sector in Tajikistan. In fact, this observation can be extended to all the representatives of the generation and transmission companies that the Team encountered in the CAR. The region is well-served by personnel with the technical competence to successfully implement further reform of the electrical sectors of their respective countries.

Pamir Energy is providing electricity to a mountainous area with sparse population living in scattered villages. Pamir Energy, in which the Aga Khan Fund for Economic Development is the majority stakeholder but also including investment from the International Finance Corporation (IFC), was given the concession for providing electricity in eastern Tajikistan in 2002. Thus, the project has only two years operating experience and is being watched to determine its longer term success, both as a means of providing electricity to hard-to-serve areas but also as a model for any kind of public/private partnership. The Aga Khan Foundation is well known for its work as an NGO in the rural and mountainous areas of Tajikistan and Pakistan, and the investment to provide electricity in Tajikistan seems a natural extension of that work.

Trends and Planned Directions. Tajikistan plans to participate in negotiations, conducted under WEC, directed to the improvement of the 1998 Framework Agreement. One interviewee suggested that the Tajiks are controlled by the Uzbeks in so far as WEC deliberations are concerned and, if true, the position on most issues regarding modification of the Agreement can be expected to be those of Uzbekistan. Discussions in Tashkent suggested that the Uzbeks favor the 1998 Agreement as the basis for negotiation. However, the Team would not go so far as to make that assumption that Tajik positions will mirror those of Uzbekistan. Certainly, Tajikistan will be highly influenced by Uzbekistan and will insist, as will Uzbekistan, on a confirmation of the benefits that accrue to Tajikistan of any significant change from the 1998 Agreement. Interestingly, although the Deputy Minister of Foreign Affairs suggested that the 1998 Agreement can form the basis of a new agreement, but with improved mechanisms for control and monitoring, the Minister of Energy said the Agreement does not work; the Minister of Water called for the design of a new agreement; and Barki Tojik said the 1998 Agreement is a “constraint.”

In the end, it is expected that the views of Tajikistan will be closer to those of an uppermost riparian country than those of countries located in the middle or tail reaches of a river. In discussions relative to the Syr Darya River, Tajikistan will assess the implications of any agreement on the use of Toktogul storage with respect to the Amu Darya River and the eventual storage to be provided by the Rogun Hydroelectric Project. The reference in the discussions with the Vice Minister in the Kyrgyz Republic to the fact that Tajikistan and Kazakhstan, together with his country, are working on the design of a new agreement suggests that at least some in Tajikistan view their interests as different from those of Uzbekistan.

It is expected that work on the Tajik 500 kV connection to the Grid, bypassing the Fergana Valley congestion, will continue and gather momentum. The interest recently expressed by the EBRD in possibly providing loan funds for the transmission line connection from Tajikistan to Kabul may be extended to the 500 kV connector line to the Central Asian Grid. Reform and privatization of the electric system in Tajikistan will continue. Losses in distribution are reportedly high and this problem will become more evident, as in the Kyrgyz Republic, and lead to consolidation of distribution systems and their eventual privatization, following the track of Kazakhstan and the Kyrgyz Republic.

2.8. Afghanistan



Two members of the USAID staff in Afghanistan (Barry Primm, Deputy Director, USAID/Kabul and Dr. Peter A. Jerzek, Deputy Director, Office of Infrastructure, Energy and Engineering) traveled to Dushanbe to carry out discussions with the Team and USAID staff in the CAR relative to possible coordination of future development of the CAR countries with Afghanistan. Consistent with the Team's SOW for CAR, both the water and power sectors were the focus of initial discussions. Although Afghanistan and several of the CAR countries share the Amu Darya River Basin, significant opportunities for joint development projects involving the Amu Darya water resource are not evident, at least for the near future. Prospects in the electrical sector are, however, better. Afghanistan is deficient in electric power, and much of what is currently available is supplied from high cost diesel units. Several of the CAR countries currently have the capacity for generating electric energy surplus to their own needs (expansion of present viable capacity possible by rehabilitation/completion of existing TPP and completion of some HPP), which can be directed to economically satisfy Afghan requirements. A means of transmitting the electricity to Kabul and other centers of demand is required. Alternatives for transmitting power to Afghanistan are presented later in this report.

3. ISSUES, CONSTRAINTS AND OPPORTUNITIES

The previous section presented the views of host-countries' government officials and representatives of key donors and IFIs relevant to an understanding of the situation in each country related to the transboundary water and energy problem in the CAR. Based on the interviews, presumed incentives, country histories (including those of cooperation or non-cooperation), and the current economic situation in each country; policies, institutional capacities and trends and planned directions for each country were determined. In the case of many of these issues, especially a country's planned directions, the judgments of the Team are based on inferences from the information, not on any particular statement by the various officials related to planned strategies or directions.

This Section takes a more regional view of the water and power situation, assembling the individual countries' conditions and perspectives into a unified perspective related to resolving the transboundary water and energy problem. Consistent with the SOW, it is in this space or zone of opportunity that USAID/CAR has been effectively working for the last ten to twelve (10-12) years and will likely find additional opportunities for helping the region achieve its objectives for the water and power sectors.

3.1. Regional Issues

3.1.1. Economic Development.

The overriding issue for the region is how to best achieve its goals for economic development and improvement in the well-being of its resident population. Although the economic growth strategy of the countries of CAR is not necessarily within the purview of the Team's assignment, differences in strategies and outcomes, at least up to present, were apparent to the Team as it traveled through the region and interviewed officials of government and donor agencies. As other observers have concluded, and as also became obvious, there are wide differences between the countries' development strategies. Kazakhstan has implemented an aggressive program of internal reform, reducing state involvement in the economy, while at the same time encouraging foreign investment. And that strategy appears to be working. Some may say that Kazakh growth is largely due to the country's generous endowment of oil and other natural resources. Rigorous economic analysis may be able to show whether or not that is the case. In terms of this assessment that is not the most important issue. Rather, Kazakhstan's recognition of its role as a leader in the region, demonstrating successful strategies, and in that role, its impact on other countries of CAR, and even potentially on Afghanistan, are the more important issues.

The interview conducted with the representative of Foreign Affairs in Astana confirmed that Kazakhstan recognizes its role as a regional leader. In explaining to the Team the prospects for a negotiated settlement of the Toktogul allocation problem, the Foreign Affairs representative pointed to the need for rehabilitation of infrastructure throughout the region, and then followed this up with the observation that some countries cannot afford the needed improvements and, in those cases, Kazakhstan can afford to contribute more. Throughout the conversation, he referred to the importance of the principle of profitability and the demonstration effect that Kazakhstan has on the region. The World Bank Country Manager in Astana stated that Kazakhstan is the only country in the world that contributes to an ongoing

joint economic research program with the Bank, bolstering the assessment that Kazakhstan is firmly committed to its strategy of development.

Of the CAR countries visited for this report, Uzbekistan stands at the other extreme in terms of growth strategies. Firm state control coupled with self-sufficiency, import substitution and slow reform seems to be its guiding principles. The outcome of this strategy, at least as indicated by results to date, has not been favorable. The Team was told that Uzbekistan cannot afford to invest in new generation capacity, and even the rehabilitation of its aging fossil fuel plants is difficult because of lack of finances. The agriculturalists told the Team that the Uzbek farmers had not been paid for last year's wheat crop and there had been no government investment in irrigation works in the last two years. The unwillingness of the World Bank to fund the major irrigation projects in Uzbekistan, apparently because of the risk that Uzbekistan will be unable to service the loan, is also telling.

The smaller countries, the Kyrgyz Republic and Tajikistan, appear to lie between their two larger neighboring countries in terms of the progress of the reform process. Agriculture is an indicator of the general attitudes to reform. In that regard, both countries have adopted the standard change model for agriculture, including charging farmers for water (Uzbekistan has not introduced such charges yet) and moving in the direction of allowing farmers to make their own decisions independent of previous pressures from "investors" and others. Although these changes are in the initial stages, the countries seem committed to them as the means of reviving agricultural output. Progress of reform of the electrical sectors is also in its initial phase, but here again, the countries following the Kazakh model, seem committed to reform and privatization of their generation and distribution plants.

It is assumed that the growth strategies and consequent outcomes described above for each of the countries will continue. Should that be the case, three of the four CAR countries will likely be growing quite nicely ten years from now. The outlier will be Uzbekistan, giving rise to the following question: Will Uzbekistan change its strategies and open its economy to trade and, in so doing, cooperate more fully with other CAR countries to resolve regional problems? It seems inevitable that should the economy continue its present slide and private investment, as the Team was told, continue to flee the country, the Government will make a mid-course correction. But will this occur, and if it does, will changes be made within the next year, five years or ten? Prospects for successful outcomes of attempts to resolve regional issues are, at least in part, a function of the economic and social well-being of the negotiating partners.

3.1.2. Water and Energy Consortium (WEC)

WEC is the major regional effort to deal with transboundary river management issues, and it represents the best current opportunity to obtain full participation from all riparian states in developing or revising agreements governing transboundary rivers of the Aral Sea basin. Despite efforts by Uzbekistan to develop additional irrigation storage capacity on its own territory, in order to reduce its dependence on upstream neighbors, there continue to be significant untapped net regional benefits from cooperation on water and energy management for the Syr Darya and other basins. Kazakhstan serves as the chair of this effort, and the World Bank has been designated by CACO as the lead donor for this subject. A working group has been established under the CACO to develop the concept of the WEC and to submit it for consideration to the Heads of States of the CACO countries during the next meeting.

Formation of WEC has been agreed to in principle by each of the four countries. It seems that is what the Minister of Energy in Tajikistan meant when he suggested. “WEC has already been signed.” But another interviewee in Tajikistan asserted that “WEC has no depth” following with the questions “who will provide financing and what will be the staffing--no one knows.” These questions are important but at this point in the design of WEC, the answers are apparently under development. Based on a discussion with the World Bank Country Manager for Kazakhstan, it is understood that the World Bank has been tasked by the Kazakhstan with the assignment of putting together a draft proposal of the organizational structure, financing and other aspects of the Consortium. An initial idea displayed in the Regional Electricity Export Potential Study (REEPS) of the World Bank showed a Secretariat responsible to CACO. The Kazakh Foreign Affairs representative suggested that the four parties would agree to all organizational details in 2005. More optimistically, the ADB Country Director for the Kyrgyz Republic, who has been tracking progress for the ADB, estimates a signing date at the WEC March 2005 meeting in Bishkek.

Although all indications point to eventual approval of WEC as the agreed organization for addressing regional issues, there are those, as evidenced by the above comments/questions, that have their doubts. The Vice Prime Minister in charge of CAR Relations, in the Kyrgyz Republic certainly conveyed that the Kyrgyz Republic has a ways to go before it will agree to WEC or a similar type organization.

Others point to the ADB-supported initiative to organize working groups in each country as their favored approach for addressing perhaps the most burning problem to be taken up by WEC - the transboundary water and related hydropower situation. Nevertheless, it seems based on the views heard from government officials together with the momentum already generated from high-level political agreements, that WEC will become a reality. AEAI is basing our evaluations of possible USAID activities upon this belief. Yet, until final agreement is reached and WEC does become a reality, some risk remains as to the course of action for USAID.

3.1.3. Program of Work for WEC

What will WEC do once its organization is agreed upon? The spokesman for the Foreign Ministry in Uzbekistan commented that the preliminary agreement that has been signed by the countries is “philosophy” and the real test remains. There is a history in the CAR of organizations and agreements floundering during implementation. There is reason to believe, though, that WEC may be different. Reasons given by proponents of WEC for this viewpoint include: (1) WEC is a local initiative, not an idea of foreigners thrust upon the local governments as a conditionality; (2) it has the highest level of political support possible, the presidents of the countries acting through CACO; (3) World Bank specialists, drawing upon experience elsewhere with regional organizations, are providing technical support when requested by the CAR governments; (4) WEC is reported to be promised financial support from the World Bank, ADB and EBRD; and (5) WEC is viewed as the best way to address water and energy nexus problems through close integration of host countries’ and donor/IFI community efforts. Although details of past institutions’ implementation failings were not provided, it is unlikely that they had the support programmed for WEC.

The World Bank has suggested a set of early activities for WEC oriented around learning of experiences elsewhere in the resolution of transboundary water and energy conflicts. The

World Bank Conception on the Creation WEC reflects the agreed point of view of the member countries of the CACO on the creation of favorable economic and legal environment for economic entities of water, fuel-energy and other sectors of the CACO member countries.

It is anticipated that during the initial stage of WEC engagement with the transboundary water issues emphasis will be given to the systematic assembly of worldwide experience, both the process by which other countries have arrived at agreements and the content of the agreements themselves. Based on the results of the first stage engagement the Secretariat of WEC together with the World Bank will be in a position to determine the need for and desirability of a second stage engagement between the countries, say, for purposes of the preparation of river basin development plans. The second stage process, (should it be required to change entrenched positions) will need to demonstrate to each of the countries that their interests are best served by cooperation rather than a continuation of the uncertainties inherent in maintaining the status quo. The need for such a process is simply a judgment by the Team based on interpretations of country situations and, by extension, estimations of what it will take to change both stated and underlying positions. The judgment that a more rigorous process of planning and analysis will be required, as contemplated for a second stage, may be appropriate. Advance budgeting by USAID for funding of a second stage of assistance needs to recognize this uncertainty.

3.1.4. Electric Power Sector

Transmission. When the CAR countries gained independence in 1991, they each became owners of the energy resources and infrastructure that fell within their national borders. The legacy included the actual physical facilities associated with each form of resource along with the infrastructure to transport the resource. In the case of natural gas and oil, the transportation facilities consisted of pipelines between the CAR countries as well as links to Russia. The electric resources included power generation plants and a bulk power transmission grid that linked the five CAR countries. In 1991 the CAR grid was not connected to the Northern Kazakhstan grid and exports to Russia were not possible.

In the initial years after 1991 the new political leaders of the countries attempted to operate the pipelines and transmission grid as separate national systems. It was soon realized that the regional aspects of the pipelines and transmission lines could not be separated into individual national operations. With the assistance of international donors, such as USAID, the electric grid was redefined for operation according to regional power pool principles. This activity was ratified in the Parallel Operating Agreement.

The idea of cross border power trading among countries using modern computer-based trading systems is some time off. It was pointed out during with interviews that the mindset among government agencies is that electricity should be treated like other commodities and subjected to rigorous export/import documentation for assessment of taxes at the border. Assistance in resolution of this type of problem is an area in which donors and IFIs could provide assistance.

Transmission and dispatch ownership should not be a problem given that transmission and generation are separately owned and operated. There is a definite requirement for anti-monopoly commissions to monitor the respect for the “Chinese wall” between generation and transmission, and there may be opportunities for donors such as USAID to play a role in the monitoring activity.

The Central Asian Transmission grid connects the countries of Tajikistan, the Kyrgyz Republic, Kazakhstan, Uzbekistan and Tajikistan. The operation of the system is controlled from the UDC Enerгия dispatch/control center in Tashkent, Uzbekistan. Figure 1 "Greater Central Asian Interconnected Grid" presents a simplified schematic diagram showing the 500 kV transmission lines and substations that are generally considered to constitute the CAR regional transmission grid.

Generation Capacity. There has been little new capacity added in the region since the collapse of the Soviet Union. The one exception is at the Ekibastuz station owned by AES. In Uzbekistan the 800 MW unit at Talimarjian is constructed but not yet brought into commercial operation. The EBRD has funded the rehabilitation of two fossil fuel generating units in Uzbekistan and would like to fund additional rehabilitation projects. However, future loans are stalled because the EBRD Board has issued a hold on loans to Uzbekistan until human rights and similar issues are resolved. Available capacity compared to demand is summarized in the following table.

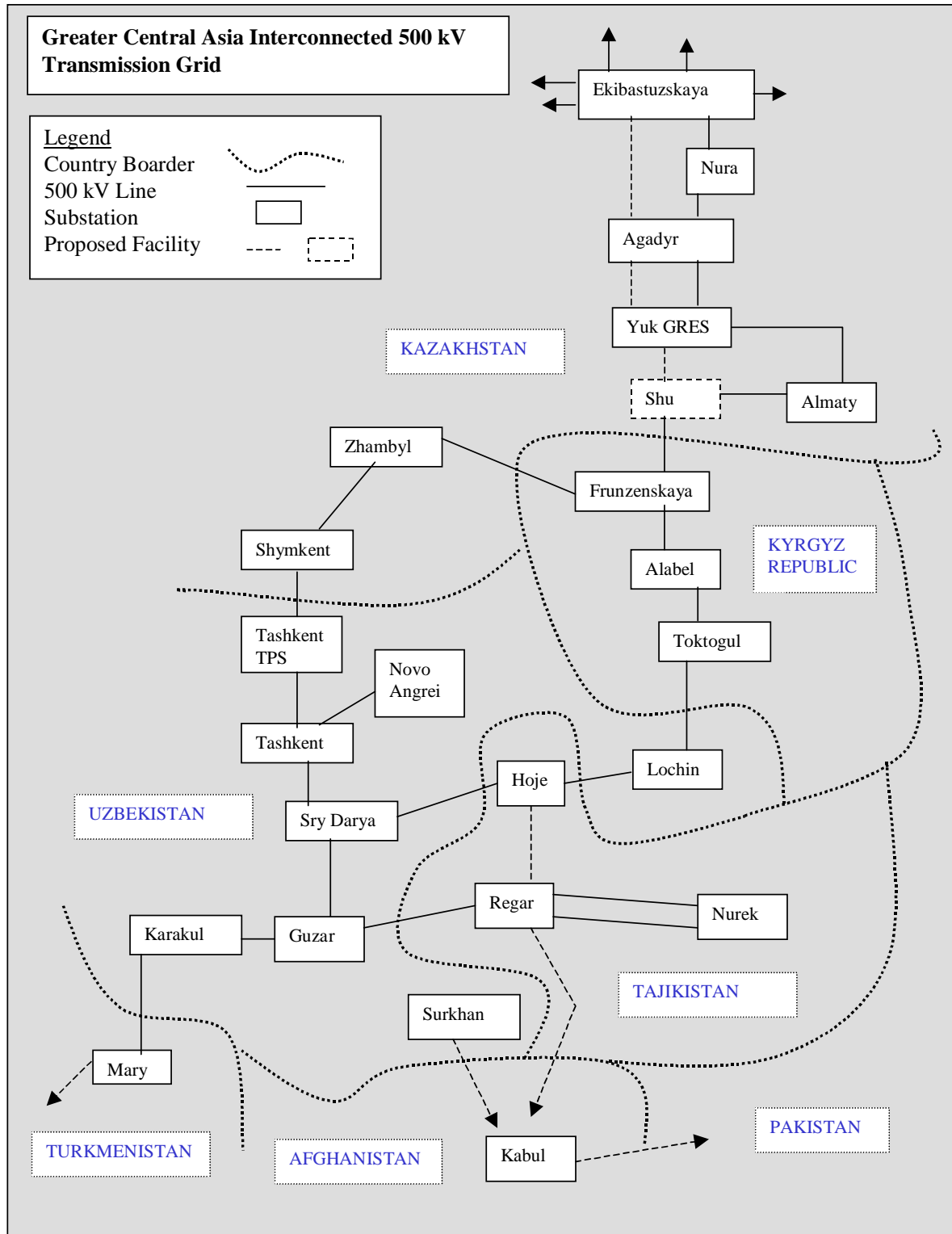
Generating Capacity Summary in MW for Year 2002⁶							
Country	Hydro	Thermal	Total Installed Capacity	Available Generation Capacity	Peak Demand	Difference; Available – Peak Demand; Surplus (Deficit)	Per Cent Capacity Surplus
Kyrgyz Republic	2,950	763	3,713	3,100	2,687	413	15.4%
Tajikistan	4,059	346	4,405	3,428	2,901	527	18.2%
Uzbekistan	1,710	9,870	11,580	7,800	7,925	-125	-1.6%
Kazakhstan	2,000	16,240	18,240	13,840	9,432	4,408	46.7%

Based on an interview with the Vice President for AES in Kazakhstan, the available capacity in that country is only about 11,000 MW, somewhat less than reported in the World Bank Report. The peak load in Winter 2004-2005 is expected to exceed 10,000 MW, leaving relatively little capacity in reserve.

Unified Transmission Grid of Russia. Implications for CAR generation and transmission systems and grid operators, as Russia (RAO UES) pursues plans to achieve a synchronous connection to the European UCTE system, are important to recognize. Because the Unified Power Grid built during the Soviet Union times includes the CAR power grid, the Russian power company will have to take into account the need to upgrade generators and systems in CAR. A straight forward approach to a synchronous interconnection of the Russian and CAR grids to Europe would require CAR generators and transmission systems to upgrade to a level that is acceptable to the UCTE. The cost to CAR generators for the necessary upgrades to satisfy UCTE standards is not insignificant.

⁶ Central Asia Regional Electricity Export Potential Study, World Bank, Europe and Central Asia Region, June 2004. This data represents the status of supply and demand as of 2002

FIGURE 1
GREATER CENTRAL ASIA INTERCONNECTED 500 kV TRANSMISSION GRID



A high power back-to-back HVDC interconnection is one alternate solution. Another alternative would require the upgrading of the controls of existing generators to be in conformance with UCTE standards for frequency control and operations. As the Russians move forward with plans for the synchronous interconnection to UCTE, the CAR generators and transmission operators should inquire of the Russians what the plan is with regard to CAR generation.

The EBRD has been working with the Federal Grid Company of Russia (RAO UES) on projects involving both technical and economic aspects. At a meeting with the EBRD in London, it was learned that the Russian power system would probably not be in a position to interconnect and export electric power and energy to Europe, according to UCTE standards, for another ten years (2014). In view of this, the impact on the CAR power system will not be a factor in the next few years.

3.2. Regional Constraints

3.2.1. Country Sovereignty

Having recently emerged as independent states, the countries of CAR are not by nature inclined to enter into long-term national commitments that might compromise their independence of action or make them dependent on another country. Sovereignty is a major issue for all CAR countries but it seems to be especially valued in Uzbekistan. The country's policy of self-sufficiency and import substitution is consistent with concerns for sovereignty. Requests by other countries to conclude a long-term agreement with the Kyrgyz Republic and the other CAR countries over use of Toktogul storage suggests long-term dependence on another country, a condition at odds with complete independence of action. Moreover, Uzbekistan as well as the other countries cannot help questioning the reliability of Kyrgyz promises, should they be made in a renewed agreement, to deliver water in accordance with agreements in view of the winter heating problem and inefficiencies in the Bishkek distribution system. Because of this condition, some believe that the Kyrgyz Republic will be unable to store adequate water in winter to fulfill irrigation needs of the downstream countries should a drought occur. One interviewee said that a solution of the Kyrgyz winter heating problem and attendant losses would go a long way to solving the transboundary water and energy problem.

3.2.2. Decision-Making

The AEAI Team was not in the CAR long enough to be able to assess (based on real time instances) the timeliness with which the governments of the different countries make decisions. It is apparent, however, that one country stood out in terms of un-timely decision making. Uzbekistan is noteworthy for its slowness in concluding agreements. The PTRAs loan project of the ADB is one example. Having seemingly agreed to the loan and its conditionalities two years ago, the loan documents have remained unsigned. Whether the delay is due to bureaucratic infighting, cultural aspects, negotiation approach/technique, existence of only one decision-maker as some have said, attempts to squeeze the last concession from another party or a fear of fundamental change such as are implied by the words "open access", it is likely to be a pattern that will be repeated in the future. Consequently, negotiations to revise a significantly changed 1998 Agreement or a new agreement not based on the 1998 document will likely take time and patience.

The ICWC comprises officials (generally Ministers or Deputy Ministers) from the Ministries of Water and Water Resources Agencies of all the member countries. ICWC's decision making is based on the proposals formulated and analyzed by its secretariat located in Khudjent. Allocation of water and monitoring water flows are the responsibilities of the basin water management organizations, called BVOs, one each for the Syr Darya and Amu Darya basins. Scientific and information support at the interstate level is provided by the Scientific Information Center (SIC) of the ICWC.

In the electricity sector, the Central Asian Power Council (CAPC), comprising representatives from the electricity or grid companies of the CARs, has been established and this Council formulates quarterly power exchange schedules. There are also a number of multilateral and trilateral agreements between the upstream states (the Kyrgyz Republic and Tajikistan) and downstream states (Kazakhstan and Uzbekistan), which regulate the water and energy flows and set out a framework for mutual obligations and benefits. The Unified Dispatch Center, Energia, in Tashkent is responsible for maintaining the balanced and synchronized operation of the power transmission and distribution system. Energia's Dispatch Service performs the task of translating the quarterly power exchange schedules into daily schedules for generation unit commitment. Energia's Energy Regime Service attempts to balance irrigation and hydropower requirements, which is the most controversial issue in the region. Energia also has the responsibility for ensuring overall system security, and for frequency regulation.

ICWC is purely a water-focused body with no representation from the energy or environment sectors and this has proven to be a major handicap in a system in which water and energy interests are intertwined. The BVOs and the Energia lack an international character, consist almost exclusively of staff and officers of the host nation and do not give the impression of functioning impartially among the constituent member countries. Their expenses as well as the expenses of the Secretariat of ICWC are met by the host nation only. Neither ICWC nor the BVOs and Energia have any power or mechanism to enforce the implementation of the Agreements.

3.2.3. Corruption

Corruption in the CAR as in much of the developing world is a major problem. According to assessments of Transparency International, all four countries visited in the CAR score less than 3.0 out of 10.0, which indicates rampant corruption. The highest ranked is Uzbekistan with a score of 2.3 and the lowest is Tajikistan at 2.0. The other two countries have been assessed numerical values in between highest and lowest.. The scores for the CAR countries may be compared to those of Finland, New Zealand and Denmark that rank the best in terms of transparency and governance with ratings of 9.5 or greater..

Corruption occurs when a private individual bribes a public official to acquire an economic privilege worth more than the bribe. An example of this is the payment of bribes to meter readers to under-report electricity usage, a practice that is extensive in The Kyrgyz Republic and likely elsewhere in CAR. In economic terms, corruption represents a tax on economic growth. To often, it has the effect of diverting resources to consumption and away from capital investment. In the case of the theft of electricity, resources that could otherwise go into rehabilitation of electric systems are diverted to personal enrichment. The corruption tax is not necessarily an insurmountable barrier to economic growth but it does act to constrain the rate of growth.

Democracy and the transparency that normally accompanies democracy represent the best protection that society has against corruption. As illustrated by the corruption indicators given above, the CAR countries are far from the condition of open and transparent governments. The command economy that existed in Soviet times and, in the main, continues to exist in Uzbekistan, created a bureaucratic system of natural corruption. No one had incentive to work faster or more efficiently. If according to the plan, twenty applications were to be processed this month and there were thirty applications and an applicant wanted their application to be within the twenty to be processed then a bribe (gift) would be required. The larger the bribe, the higher in the stack of twenty applications that special application would end up and the sooner that application would be processed. This process was so ingrained that known “gate keeping” jobs required a bribe to get (and keep) and official compensation for these positions was sometimes kept very low. As this applies to the meter reading issue in the Kyrgyz Republic as it is unlikely that this theft is an independent action by individual meter readers but is part of a more elaborate (and harder to remove) process.

The countries of the CAR are engaged in a transition from these times, some such as Uzbekistan not as rapidly as others. In this regard, the Team was encouraged by the seemingly serious parliamentary debate over electric sector reform that was going in the Kyrgyz Republic while the Team was visiting Bishkek. As a part of that debate, one group of lawmakers maintained that reform to allow concessions or privatisation of electric distribution would result in substantial increases in tariffs, something that their constituents could ill afford. Since the present rates are set well below the cost of service this concern is valid. Another group maintained that savings in energy losses introduced by concession/privatisation would be sufficient to obviate the need for rate increases. Since current revenue is not sufficient to perform necessary preventive maintenance on distribution and generation systems this assumption may be incorrect. In the end, the Team was told that Parliament agreed to a general concession law and also to establish a Ministry of Energy. Ideally, the new Ministry will insist on credible financial audits for all electric sector companies in the Kyrgyz Republic, something that has been lacking in the last two to three years. In addition, funding of the State Energy Agency may be increased to a level adequate to enable it to perform its independent regulatory function. Whatever the case, the demonstration of the democratic process in action in the Kyrgyz Republic, although not providing a clear cut win for reform, is a good sign for the future including the eventual reduction if not elimination of the corruption tax.

3.2.4. Characteristics of the Water Resource

The unpredictability of flows in the Syr Darya River and downstream tributaries is a factor that needs to be recognized and dealt with in negotiations, particularly if the intent is to enter into long-term and binding water sharing arrangements. In the last two years, flows in the tributaries below the Toktogul reservoir together with normal summer releases from the reservoir have been adequate to satisfy the irrigation requirements of the downstream countries. By opting out of annual negotiations called for in the 1998 Agreement, Uzbekistan has been able to save the winter fuel compensation that would have otherwise gone to the Kyrgyz Republic. The savings have been especially valuable to Uzbekistan during the recent period of tight economic times. From Uzbekistan’s perspective, the process by which annual agreements are made has the virtue of enabling adjustment of negotiating positions depending on water availability in each year. Little cognizance is given to the possibility that at some future point the water may not be in the reservoir when needed. When water becomes scarce, the potential for domestic unrest increases. As the Director of BVO Syr Darya reminded the

Team, some 9.0 million people live in Fergana Valley, most of them of Uzbek heritage. For the Director, stability of irrigation is most important. A long-term agreement would provide that stability, but reaching such an agreement is complicated by the uncertainties related to flow conditions and the perception that the greater advantage can be achieved by annual agreements.

3.2.5. Transmission Congestion

The portion of the 500 kV CAR Grid that is within the borders of Tajikistan consists of two parallel single circuit 500 kV lines and a portion of a line to Uzbekistan. The transmission lines within the Tajik borders connect the Nurek hydro plant to the Regar substation. The Regar substation provides power to the aluminum smelter in Regar. The Regar substation is near the border with Uzbekistan and also has a terminal for one 500 kV line into Uzbekistan. The 500 kV transmission connection from Tajikistan to Uzbekistan is via the 500 kV Regar – Guzar line; the Guzar substation is in Uzbekistan and is part of the CAR transmission grid as is illustrated in Figure 1 "Greater Central Asian Interconnected Grid" .

Barki Tojik suggests that there is a problem sending power through the Uzbek 500 kV transmission line due to transmission congestion. Barki Tojik also claims that Uzbekistan has refused to allow the Tajik energy to flow over the 500 kV Regar – Guzar transmission line.

The Regar-Guzar line is the only line that the Tajiks can use to export power to other countries. There are some 220 kV and lower voltage lines that supply distribution loads in the Fergana Valley along the route of the 500 kV Syr Darya – Lochin line. Both Tajikistan and the Kyrgyz Republic are constructing new lines and substations in this area to meet the needs of load centers in the Fergana Valley. However, these lower voltage lines will not provide the necessary transmission connections and transfer capacity that is required to allow Tajikistan to export hydropower to the North. In addition to the lack of transmission capacity for export, due to geography (mountains between the northern and southern portions) Tajikistan must use the Uzbekistan transmission grid to send power from hydro plants in southern Tajikistan (Nurek and Baipasinsk on the Vaksh River) to loads in northern Tajikistan and to Khujant.

The inadequacy of transmission capacity to the CAR Grid through Uzbekistan also results in the situation that requires Tajikistan to spill water at Nurek in summer because they cannot transmit hydro generation north to Kazakhstan and Russia. If Tajikistan had transmission lines, such as the proposed line to Khujant, Tajikistan could export power instead of just spilling the water from Nurek. In view of the situation, the Tajiks want to construct a 500 kV transmission line on their territory so they can export power to the north so they will not have to send power through the Uzbek 500 kV lines to potential CAR loads north of Tajikistan.

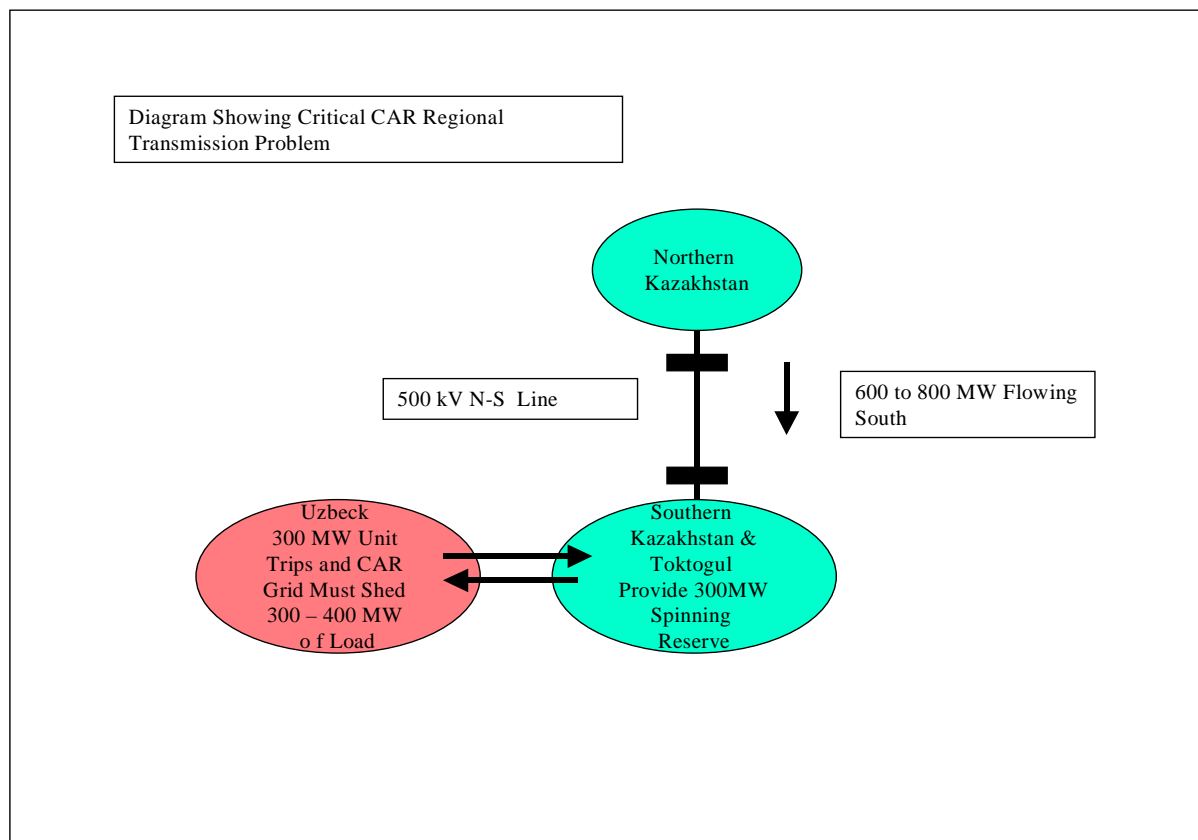
3.2.6. Improved Controls for 500 kV Power Line Separation

The figure below summarizes the essential points of a critical operating situation that is faced by the CAR systems. The situation exists when there is a nominal 350 to 400 MW power transfer from north Kazakhstan to south Kazakhstan and a 300 MW generating unit in Uzbekistan trips off the line. When the Uzbek unit trips, the immediate response is an increase in power flow on the North/South line from the Russian grid. The North/South line then trips off due to over load protection relay action. The CAR grid is now deficient in generation (about 300 MW plus the import from north). System frequency begins to drop

and often reaches 48.5 Hz. Generators in CAR with spinning reserve must respond and make up the difference. However, there is only about 300 MW of spinning reserve at Toktogul. There may be additional spinning reserve in Tajikistan at Nurek, but this may not be available due to transmission congestion. After spinning reserve is dispatched and the generation deficiency still exists, it is then necessary to shed load. Because Toktogul is operated manually the ramp rate is slow.

Several technical people who were interviewed about the problem indicated that the situation would be resolved when the second 500 kV North/South transmission line is constructed in Kazakhstan. Notwithstanding the positive opinion, there remains the fact that as power transfers on the two parallel lines increases, and without upgrades of controls on generating units in Toktogul or at the UDC, there will continue to be a risk of a region wide blackout following a contingency event. The need for improved controls and communications systems that can deal with the situation will be a subject for regional transmission system operators at UDC as well as for transmission system planners. International donors could provide technical assistance related to this problem.

FIGURE 2
DIAGRAM OF CAR TRANSMISSION SEPARATION PROBLEM



3.3. Regional Opportunities

3.3.1. Transboundary River Disputes

As the AEAI Team traveled around the region and visited with numerous local officials, it was found that very little rancor or criticism was expressed by officials toward counterparts in other countries. The most that was heard with respect to the Syr Darya issue was a feeling of regret as to the direction of events. There was none of the animus that one might have expected from representatives of countries in conflict over the use of a vital water resource. If there was any criticism, it was directed at foreigners, not fellow officials representing countries with far different positions on some of the issues. In part, this is likely due to the current and recent condition of adequate water for everyone. But it also may be due to a genuine regard and respect that officials have for each other, likely derived from a common history and, even in the case of some officials, previous experience working closely together in Soviet times. Also it may be that the objectivity of our perspective was constrained due to the fact that most of the meetings were on “the official level” in combination with multiple representatives of different foreign organizations. Since it usually takes some time to develop a degree of trust to gain the confidence of the local counterpart organizations to discuss hard issues it may have also been that they expressed their opinion with a more “guarded” attitude. Another possible reason is that criticism is not viewed in a positive light from a cultural perspective in CAR.

The history of previous relationships and apparent respect between officials breaks two ways. It is a positive for the initiation and conduct of discussions, all parties, if not listening to each other, at least participating in the process. The concept of working groups, proposed by the ADB with IFAS support, meeting together to resolve conflicts is consistent with the belief that the parties can arrive at the necessary compromises through dialogue, one that compares and selects options generated by the working groups. On the other hand, unless all parties agree, agreements reached in this process may not lead to optimal allocation and development of the water resource. Rather, the outcome will likely reflect the stronger views of one of the negotiating partners, necessary in the end to conclude an agreement. In this respect attention should be paid to working group dynamics and consensus building process so that all participants of the group have the opportunity to express their ideas and be heard.

The WEC process, supported by a neutral third party, the World Bank, working with governments and officials friendly, or at least respectful of each other, has the potential to arrive at agreements that achieve the goal of optimal utilization of the water resources of the Region. If that is the goal, the development of an optimum plan for both management of the water resource and its further development, one that maximizes benefits to the region and from which all countries will have a better arrangement than they do now, the WEC process is the best solution. Each of the World Bank Country Managers as well as the Regional World Bank Manager in Almaty strongly requested that USAID continue their assistance programs in the water sector and, more specifically, with activities related to WEC. Opportunities for USAID to provide assistance in relation to WEC are described later in Section 5 of this Report.

3.3.2. Energy Markets

Energy Market Opportunities. Price and regulatory reform are critical to the success of energy sector developments in each country and the region. However, a full-fledged regional

electricity market may not be immediately appropriate in the CAR. Instead, it may be necessary to evolve from the present state in two major steps. Step one would be to establish operational electricity markets in each country (with bilateral power exchange agreements) and step two would be the development of a regional market. It is conceivable that the regional market would be based on bilateral contracts together with a balancing market and a transparent pricing policy to deal with transmission congestion and use of transmission lines. It is important that institutional and structural changes take place before competition begins.

In the future energy market local generation and distribution companies would be owned separately; however, it will be necessary for regulators (Anti-Monopoly Commissions) to be vigilant with regard to the possibility of “market power” arising in unique “load pockets” that may be created by transmission congestion. There may be a role for the IFIs to assist the countries and the region in the formation of a “Congestion Rents Trust Fund.”

When the system is operated with the 500 kV ring energized (including enhanced communications - SCADA), the countries all realize several benefits. The benefits include:

- Coordination of power flows and balancing services
- Reliability in the event of a sudden outage of a transmission line or generating unit
- Electrical frequency stability through the exchange of synchronizing power among all generators
- Load following
- Spinning reserve
- Reactive power supply for voltage stability and regulation
- Stand by reserve
- Black start and system restoration

These benefits and services come at a cost. An open question is whether each participant is paying for their share of these costs according to market principles and whether the methodology being used to assign the costs is being uniformly applied. The existence of a regional market with transparent pricing methodologies and procedures would be a major step, a condition that currently does not exist. The Parallel Operating agreement does not recognize these costs and there is a need to develop costing and pricing methodologies for this class of connecting services. At KOREM there were indications that moves in this direction were underway. This could be an area in which donors and IFIs could make major contributions.

Economic Dispatch and Market Efficiency. With the exception of Kazakhstan, which has a functioning electricity market, the other CAR countries dispatch their generation facilities according to national interests. At the national level in these countries generation is dispatched according to a set of internal rules that are driven less by economics and more by availability of fuel for thermal plants, water for hydro generators, repair of equipment and transmission constraints. Dispatch decisions at the national level often include a choice between supply to internal consumers or export sales to other countries. There are reports about power rationing in rural areas while officials talk about export sales to Russia and other countries. Power sales at the regional level, between neighbors, are made according to bilateral agreements. Export sales from CAR to Russia are also made according to bilateral agreements. The parties negotiate the value of energy and the cost for transmission services associated with the transfers. Since there is no market for regional sales, the sale prices often do not reflect actual economic value and true costs.

In the case of one power sale from Toktogul to Russia, the sale price was set at a low level by the Russians and accepted by the Kyrgyz because the latter was faced with a “no win” situation. This situation arose because the water level in Toktogul was high due to a large volume of snow-melt. If the Kyrgyz could not generate and pass the water, then they would have to pass the water over the spillway. But because the spillway design was inadequate for the proposed flow, there was a high probability that the spillway structure would have been severely damaged. The Russians offered to take the power at a very low price as a “favor” to the Kyrgyz – in view of the circumstances; the Kyrgyz accepted the low price.

In Tajikistan, it is reported that water was spilled because transmission congestion on the Uzbek 500 kV transmission system prevented the flow of electric energy. The amount of water spilled in a recent year of high flow had an equivalent energy value of 5 million kWh. In Uzbekistan, there is often no reserve generation during evening hours in winter. At other times, when power is flowing from north to south on the 500 kV line in Kazakhstan, the system is difficult to control when an N-1 (worst case transmission link loss) event occurs. In 2004, there have been two “near misses” in which the entire CAR transmission system avoided a black out situation when the North/South 500 kV line in Kazakhstan tripped out (was disconnected).

4. CURRENT BILATERAL AND MULTILATERAL DEVELOPMENT SUPPORT PROGRAMS IN THE CAR REGION

The purpose of this section is to examine the ongoing programs of USAID, other bilateral donors, and International Finance Institutions (IFIs) in the water and energy sectors of CAR. In accordance with the SOW, this examination includes an assessment of the aims of the ongoing bi- and multi-lateral programs as well as their success in achieving those aims. The objective of this assessment will be to indicate how future USAID activities can be implemented to increase the mutual effectiveness of donor assistance in CAR. Significant programs of the donor agencies are described in Section 4.1 followed by our assessment of each program with the intent of offering suggestions to improve the mutual effectiveness of the assistance activities.

During discussions with USAID staff, it has been suggested that the impact of private investors outside the donor and traditional IFI loan programs should also be included in this report. Consequently, to examine the impact of current and planned donor programs in this Region, AEAI has included a review of the considerable investment and investment strategy by major potential investors outside of the CAR region (namely Russia and China). In our view, some of these investments are being driven in part by the location of CAR as a buffer zone between Russia and China. It is also a water energy investment factor that CAR's considerable oil and gas reserves, in order to be fully exploited, will need an expanded energy transmission version of the CAR's historic "Silk Road" transit/transportation routes between East and West. Consequently, both Russia and China will focus on export-oriented investments in energy transmission (oil, gas, electricity) and the development of hydroelectric generation assets to facilitate the export of CAR oil and gas currently used for internal use in electric power production.

4.1. Description of On-Going Programs

The focus of the programs of major donors in the CAR region has changed since the early 90's when they initially began assistance to the region. In part, this focus has changed to reflect the evolution of the independent national character of the individual CAR states, and in general, donor-funded programs that have focused on energy issues have shown more favorable results than those that have focused on the water issues of the transboundary water and energy nexus. This more favorable result appears to be due, in part, to the fact that authorities in CAR generally appear to recognize that the cost of generation and transmission of electricity has to be paid for by the consumer, while fewer parties recognize the need to pay for the equivalent ancillary services, collection, storage and transport costs in the water sector⁷. The recent focus of donor coordination and cooperation efforts in the water sector has shifted from those that focus on a broader, more regional perspective to those that are more country-specific. They have generally focused more on local, national, and/or bi-lateral issues as each CAR country has tended to address independent rather than regional solutions to economic security issues related to the water and energy sectors of their economy.

⁷ Central Asia: Water and Conflict, International Crisis Group (ICG), 2002, pp 16.

4.2. Donor Programs

4.2.1. US Agency for International Development (USAID)

USAID has been active in the water and energy sectors of CAR since 1993. USAID activities have been implemented at the local, national, and the regional levels, and they have encompassed a wide variety of projects. Some of its most important activities have sought to address the difficult issues associated with transboundary water and related hydropower resources that all the CAR nations possess and manage.

USAID technical assistance in water resources in the CAR region can be divided in the following phases:

- 1993-95 – humanitarian aid for the Aral Sea Ecological Zone through contributing to the improvement of portable water supply systems in Kazakhstan and Uzbekistan as well as the construction of a water demineralization facility in Turkmenistan.
- 1995-98 – technical assistance that began to address environmental and energy policy issues as well as Aral Sea basin water management problems.
- 1998 – 2000 – further assistance in policy development for improved regional and national water management; the development of river basin development models, the creation of regional agreements on water sharing, the development of irrigation water users associations in selected countries, and environmental and energy information networking.
- 2000 – 2005 – a shift in focus of USAID efforts from holding national dialogues to demonstrating and testing policies and regulations in response to successes in drafting policies not being matched by successful implementation. This shift resulted in a greater focus on development of replicable models of integrated resource management and training of natural resource managers. Specific attention was also given to working with regulatory agencies, supporting their independence and transparency.

USAID's present Strategic Objectives (SO) in the areas pertaining to this Assessment Report are outlined in SO 1.6. - "Improved Management of Critical Natural Resources, Including Energy". This SO reflects the increasingly important role of natural resources in the development of a competitive, market-oriented economy. USAID is now focusing on integrated management approaches for resources, thereby combining activities of formerly separate environmental and energy objectives. SO 1.6 covers the timeframe of 2001 – 2005. There are four Intermediate Results (IRs) that are being sought from the above strategic objective:

- IR 1.6.1: Increased Management Capacity in Natural Resources Sector.
 - This IR seeks to emphasize the importance of management issues towards achieving this SO, and it is focused on providing decision-makers with improved information resources which they can use in making informed and timely decisions and with training to improve decision-making skills of policymakers and planners.
- IR 1.6.2: Improved Policy and Regulatory Framework for Natural Resources Management.
 - Focusing specifically on policy, this IR addresses the difficult interstate coordination issues of the CAR region, and it attempts to assist regional

organizations in improving the effectiveness of current intrastate organizations, agreements, and regulations.

- IR 1.6.3: Sustainable Models Developed for Integrated Natural Resources Management.
 - To demonstrate the benefits, effectiveness, and sustainability of proposed policy and regulatory recommendations, this IR addresses the necessity to demonstrate the potential of these recommendations to the stakeholders through pilot and demonstration projects.
- IR 1.6.4: Public Commitment Established for Natural Resources Management Policies.
 - As water/ energy use and pricing often have significant local social impacts, this IR addresses the need to increase awareness of the public on the issues and to involve the public in the process of reform.

Current major USAID assistance programs in the water and energy sector described by USAID personnel during early briefings include the following major program activities⁸:

- Natural Resources Management Project (NRMP)
- Transboundary Water and Energy Project (TWEP)
- Water Users Associations Support Program (WUASP)
- Agriculture Finance Plus (AgFin Plus).

Among these, WUASP is the most recent program initiated by USAID . The objective of WUASP is to organize Water User Associations (WUA) in the region comprised of farmers in the same command area, for the purpose of supporting the Operations and Maintenance (O&M) of their jointly used irrigation works. It also seeks to work to make improvements in cultural practices leading to increases in agricultural output and improvements in water utilization. The project is intended to confirm the validity of the change model being demonstrated as a part of the projects with the intention that the model will be adopted for more widespread application by CAR governments and IFI assistance programs. This program was awarded in the Fall of 2004 under two different contracts to Winrock International and Counterpart International. The Winrock contract centers on the countries of Uzbekistan, the Kyrgyz Republic and Tajikistan and extends for a five-year period, while the Counterpart contract focuses on Kazakhstan for a one-year period.

Both NRMP and TWEP, on the other hand, are being implemented by the same contractor, PA Consulting and its Consortium Group. Contract activities for these projects were started in 2000, and they are scheduled to be concluded in 2005. As the AEAI Team traveled throughout the region, it was clear that several program activities stand out distinctly in the minds of host country government officials and donor representatives. These activities are briefly discussed in the following paragraphs (since both the NRMP and TWEP programs are managed by PA Consulting, no attempt is made to maintain the identities of each program in the following activity descriptions).

First, the Naryn Cascade Operation Planning Instrument (NOPI) component of the work effort has created significant interest to many of those interviewed in the region. NOPI is a

⁸ Since Ag Fin Plus does not involve related program elements, it is not included within the scope of this assessment. In addition, some other lesser programs are underway which are being overseen by USAID/CAR water and energy staff. They include programs for mineral management, fisheries in the Aral Sea, and the meteor burst information collection system.

computer model developed by the project to simulate the operation of the Toktogul reservoir and hydropower units together with the four downstream hydro plants on the Naryn Cascade. Among other possibilities, NOPI can be used to help in the development of operating rules for the Toktogul reservoir taking in account irrigation, hydropower, and flood control. The NOPI project team is developing a training program to more widely disseminate information about the model and to more fully familiarize operators of Toktogul in its use.

Second, the Decision Support System (DSS) is another program activity that is intended to improve operations of the river system and is also an ongoing companion activity to NOPI. DSS is a computer-based information system that currently facilitates management of the middle Syr Darya river basin by improving capabilities for forecasting future water flows followed by the monitoring of actual discharge conditions and irrigation allocations. The decision support system (DSS) for the middle Syr Darya river basin is now operational at the BVO Syr Darya.

The success of the current DSS model has resulted in a request from the Director of the BVO Syr Darya to extend the DSS to help manage the Syr Darya during the winter non-vegetation season, with a view to improve decision making on reservoir and canal operations to prevent flooding of lands in Uzbekistan and Kazakhstan, and increase winter water flows towards the northern Aral Sea. One of TWEF subtasks (submitted to USAID for FY 2005 approval) will help the BVO Syr Darya to develop the DSS into a practical tool for the management of the Syr Darya throughout the year. It would estimate the total water resources on a rolling plan through the year and would provide guidance on operation of the water reservoirs and main canal headworks in the Middle Syr Darya. The activities to achieve this objective are similar to the ones implemented to develop the DSS for the vegetation season.

Another suggested subtask for DSS application is linking DSS to better data and information reporting among the basin countries (Kazakhstan, the Kyrgyz Republic, Tajikistan and Uzbekistan). This subtask includes assistance to BVO Syr Darya in drafting and implementing a detailed plan to provide access to the BVO Syr Darya's rolling water management plan through the year and promote consensus among the basin countries.

Other activities described by PA Consulting activity leaders include: (1) pilot projects for organization of WUAs; (2) a program directed at developing alternative ways of sharing costs of O&M of irrigation systems with farmers; and (3) irrigation canal automation projects. The success of the WUA pilot projects apparently contributed to the development of WUASP, which is a far larger effort to organize and develop a model to encourage WUAs in the region.

Although implemented by separate contracts, both programs, are sharing information on results of their respective efforts. The cost-sharing program is interesting because of its potential policy ramifications. The program is an outgrowth of a request from the Ministry of Agriculture and Water Resources (MAWR) in Uzbekistan for assistance in developing a policy for sharing of costs with irrigators of the expenditures required for O&M of the irrigation infrastructure. Uzbekistan is the only country of those visited in CAR that has not introduced the concept of farmers paying for water. Seven pilot areas are being studied to determine costs to deliver water together with the farmer's ability to pay for the service. The irrigation canal automation program provides for monitoring of the performance of the Pakhtaabad Canal Pilot Project completed in Uzbekistan in 2002.

On the energy side of the water energy nexus, USAID and PA Consulting have been focusing on projects associated with energy markets, feasibility studies for hydro electric generation, rural electrification using mini-hydro systems, distribution loss improvement pilots, stakeholder training (USEA) and participant/consumer education (USEA and NARUC).

Specifically, three ongoing tasks were described during the visit to the PA Consulting Bishkek office. They are: (1) the energy loss reduction program; (2) the building energy efficiency project; and (3) a small hydroelectric project pilot study. Firstly, the loss reduction project is being conducted with SeverElectro, the electric distribution company for Bishkek, with the intention of assessing the gains in revenues that can be realized from improvements in metering. Initial results confirm that unaccounted electricity use in single-family housing areas is very high. Recorded use of electricity increased four to five times after improved metering as compared to the same period in the previous year. Secondly, the energy demand side efficiency studies are intended to address the generally very high-energy consumption ratios per dollar of GDP that exist in the CAR countries. The pilot studies have demonstrated significant energy savings from the installation of simple control equipment. And thirdly, electricity service in the rural areas of the Kyrgyz Republic is very poor. Typically, electricity is available only five or six hours a day. Prior to the completion of the multi-purpose project, there were approximately one hundred and sixty (160) small hydro projects in the rural areas, all of which were decommissioned with the advent of Toktogul. The USAID project resurrected one of these old rural hydropower projects as a demonstration of the potential for small hydros to improve electric service to rural communities.

4.2.2. Swiss Agency for Development and Cooperation (SDC)

The Swiss Agency for Development and Cooperation (SDC) has the next largest development program in the water and power sectors after USAID. AEAI interviewed SDC representatives in the Kyrgyz Republic, Uzbekistan, and Tajikistan.

SDC program assistance focuses on many similar types of projects as USAID. Both agencies have canal automation improvement projects, the Swiss design of three pilot projects, located in Fergana Valley, is based partially on prior USAID canal automation work. Within the same commands where the main and secondary canals are being automated, SDC is supporting a WUA program executed by IMMI, who are well known for their pioneering work in irrigation water management, assisted by SIC. Attention in the pilot work has been given to collection of baseline data to eventually enable an appraisal of the economics of project improvements. Also similar to USAID, SDC is funding the installation of hydro-meteorological stations on the Syr Darya and other rivers in the CAR to help improve river flow forecasts and water management.

The Swiss are co-financing projects that include the Pamir Energy public/private program and the Tajikistan Power Rehabilitation Project. The latter project supports the restoration of war damaged power transmission and distribution works, and it also provides for the rehabilitation of the Nurek Hydroelectric units. The Pamir Energy Company provides electricity to villages throughout Gorno Badakshan Oblast, a mountainous territory in eastern Tajikistan. Their asset portfolio includes a 14 MW hydro facility that is soon expected to double in size as well as the distribution network. The concession to function as the distribution company for Gorno Badakshan was granted in 2002. Ownership of Pamir Energy is shared by the Aga Khan Fund for Economic Development, the majority shareholder with 75 percent of the equity and the International Finance Corporation (IFC).

Pamir Energy is making the investment to increase its capacity to 28 MW. In order to hold down tariffs for the initial ten years of operation, during which time tariffs will be increased gradually to market rates, the Swiss Government is providing a subsidy of \$5.0 million. The universal problem of losses in distribution is being addressed by complete re-metering and the use of female meter readers who, following the model of NGO's, will provide assistance to customers in a variety of areas related to the services of Pamir Energy.

The Aga Khan Foundation is well known for its work as a NGO in the mountainous areas of Tajikistan and Pakistan. Based on previous organization efforts, Aga Khan has a presence in 450 villages in the Oblast. The IFC has assisted in providing the debt package for the investment scheme. One unique feature of Aga Khan's undertaking is its plan to subsidize tariffs, and to gradually increase the rates for 10 years until they reach market levels. The Swiss are providing the necessary funds for the subsidy.

4.2.3. EU Technical Assistance to the Commonwealth of Independent States (TACIS)

The EU Technical Assistance to the Commonwealth of Independent States (TACIS) has been active through its CAR development program since the early 1990s. It has done this through its Water Resources Management and Agricultural Production in Central Asian Republics (WARMAP) project and its Water Resources Management Information Systems (WARMIS) project through the SIC-ICWC and the Basin Management Organizations (BMOs) of the Aral Sea Basin. It has provided assistance to regional authorities in water policy and institutional development and has focused on capacity building, legal assistance, and strategies for managing water. Its current phase of assistance is focused on two pilot transboundary basins: Chu-Talas (Kyrgyz Republic-Kazakhstan with OSCE/UNECE/ADB); and the Vaksh (Tajikistan-Turkmenistan) where new models of shared water management in Central Asian conditions are being demonstrated for application/replication in other basins.

More specifically, EU/TACIS CAR Assistance Profiles include the following work in specific CAR countries:

- **Kyrgyz Republic and Kazakhstan**

Chu-Talas Project. This project is intended to be a model to emphasize the benefits to be gained from integrated river basin planning. The project covers an area that consists of 3 oblasts and 130 thousand hectares of irrigated land. It has supported the establishment of a bilateral commission that is attended by oblast governors, and it is supporting the development of a 20-year strategy for water distribution. A positive sign and consequence of the project is that the Kyrgyz Republic and Kazakhstan agreed to work together in this effort, and TACIS is working with Water User Committees in both of the countries. In the next stage of the project that is expected to begin in the near future, TACIS will be yielding its leadership role in the Chu-Talas project to ADB, who expects to strongly support water resource planning and related management in their program for Chu-Talas.

- **Tajikistan and Turkmenistan**

Vakhsh River Project. This project is located on the transborder Tajikistan and Turkmenistan. The priorities of benefit from water resource management assistance for this area are: flood control, agriculture, drinking and energy. Various bureaucratic problems exist that prevent release of water according to the needs of downstream entities. As additional hydro electricity-oriented facilities are developed, this will impact the Amu Darya River basin. The issues and cooperation begun with this bilateral project should help reduce the possibility of retracing the conflict-laden steps experienced in the Syr Darya River basin.

TACIS is also active in other projects in the CAR countries of Kazakhstan, the Kyrgyz Republic, Tajikistan, and Turkmenistan, although it has no active programs ongoing in Uzbekistan.

4.2.4. United Nations Development Programme (UNDP)

UNDP has established a Project Management Unit to implement its seven-point program targeted at what it sees as critical issues in water management. It is also working on capacity building. The UNDP has shifted its program focus from regional to bilateral and national activities. Its plans are now created on national level, and if they are successful, subsequent plans and programs will be created on regional level. A UNDP program -- The International Fund to Save the Aral Sea (IFAS) -- was assessed as not successful in getting beyond the broadest level of cooperative agreements and minimal enforcement⁹. In addition, the UNDP has started the Global Water Partnership's Caucasus and Central Asia program (GWP-CACENTA), which has a goal of building regional relationships to support, improved water management and provides a resource mobilization function for this activity in CAR.

Additional specific examples of projects and plans that UNDP has supported on national level in the CAR region include:

The Kazakhstan Integrated River Water Management Plan

- Support of the ICWC (support of several meetings)
- Support of a Regional Environmental Action Plan. For all eight basins in Kazakhstan, pilot project will be in Balkhash.

Supporting water sharing programs in the regions which included:

- Addressing environmental issues and security
- Establishing an early warning system in Ferghana Valley (social, economic, environmental)
- Achieving agreement in Ferghana Valley on water sharing in 3 countries

The provision of small grants to:

- NGO/civil society level – successful
- UN volunteers in different countries to watch how grants were used + defended NGOs if they had problems with governments
- Some solar and wind systems NGOs

4.2.5. Other Donors

⁹ Strategy and Project Activities to Support Improved Regional Water Management in Central Asia, UNDP, July 2004, pp.5

The only other bilateral program discussed in our stakeholder interviews was the British Department for International Development (DFID) that is funding an assistance program to help the regulatory agency design a tariff policy for electricity.

4.2.6. International Finance Institutions (IFI)

The three principal IFIs are active in the CAR region; they are the World Bank, the Asian Development Bank (ADB), and the European Bank for Reconstruction and Development (EBRD). The most significant programs of each of these IFIs are described in this section. Overall, the World Bank and ADB are emphasizing support of irrigation and drainage rehabilitation projects in their portfolios, and the EBRD is focusing its activities to support the improvement and provision of power, especially transmission.

The World Bank (WB) (including the loans of the International Finance Corporation).

The World Bank has been the most active IFI in the region in the area of CAR water management, having served as lead for the Aral Sea Basin Program, Phase 1 (ASBP-1) and as the executing agency for most of the Global Environmental Facility (GEF) resources allocated. In addition to the analyses and pilot activities under ASBP, World Bank land and water management programming has included country-level investments in the irrigation sector, and it has -- through its private sector funding entity, the International Finance Corporation -- funded significant commercial energy ventures in the region.¹⁰

The World Bank has also produced several insightful reviews and reports in the CAR water energy nexus.¹¹ The World Bank can be expected to continue country-level investment/loans for improved irrigation, drainage, ground water, and wetlands management, with associated conditionalities established for water and agricultural policy reforms.

The World Bank's activities now also center on providing support, as an invited contributor, to the Central Asian Cooperation Organization's (CACO) efforts to develop and implement a Water and Energy Consortium (WEC) concept, through a regional dialogue of experts in water, energy, and economic fields. It has provided support for the establishment of a working group under the CACO to develop the concept of the Water Energy Consortium and to submit it for consideration to the Heads of States of the CACO countries during its next meeting. The World Bank has undertaken work in two important inter-related areas in support of setting up the Water Energy Consortium; (1) the Water Energy Nexus in Central Asia, especially in the Syr Darya Basin, and (2) the Regional Electricity Export Potential Study (REEPS), including a proposed institutional framework for the Consortium. It previously supported a significant amount of work under the Aral Sea – Water and Environmental Management Project.

According to the Regional Program Coordinator of the World Bank, the WEC program is the highest priority of the Bank's activities in the CAR. The Bank is providing assistance in the design of the organizational structure of WEC and in its operations (including funding, staffing, and other operational matters). It is intended that the Transboundary water issues be

¹⁰ Projects listing of IFC for Mid-tier lending for CAR Banks funded 2003 and LUKOIL project funded 2002

¹¹ Water Energy Nexus in Central Asia, World Bank, January 2004

addressed as a first initiative of the WEC utilizing the experience and knowledge gained from other countries that have experienced similar problems.

The World Bank has committed loan funds for major irrigation projects in each of the four countries of CAR. These projects include:

- The Syr Darya Control and Northern Aral Sea Phase I Project in Kazakhstan (US\$73 million)
- The Drainage, Irrigation and Wetlands Project in Uzbekistan (US\$70 million)
- The Rural Infrastructure Rehabilitation Project in Tajikistan (US\$20 million)
- The Agriculture/Irrigation and Rural Development in the Kyrgyz Republic (US\$20 million)
- On Farm Water Management Project (OIP) in the Kyrgyz Republic (US\$20 million)

World Bank investment in Uzbekistan is limited at this time because of concerns about deteriorating economic conditions in the country¹². The Bank is also involved in a dialog with IFAS regarding capacity building following a highly critical evaluation of IFAS performance under ASBP-1. In addition, specific projects related to the lower Syr Darya from Chardara to the Aral Sea are also under management by the local World Bank Project Implementation Unit (PIU). Its energy sector projects focus on the identification and reduction of distribution sector losses and upon improved metering.

It is proposing to support a regional workshop to facilitate the exchange of views and experience between officials of CAR and specialists from multi-country river basin authorities that have confronted the same issues as CAR.

Other major investment projects being considered by the World Bank include the Bishkek II heating and thermal power plant and supporting the funding of a major loan to complete the North-South 500 kV transmission line in Kazakhstan. In the past, it has funded or supported the funding of a \$150 million (including syndicated amounts) loan for the LUKOIL investment in the Tengiz oil field.¹³

The Asian Development Bank (ADB)

The ADB is playing an increasingly active role in encouraging regional economic cooperation through its sponsorship of the Central Asian Regional Economic Cooperation (CAREC) forum. It has also committed to support further regional efforts to increase environmental information networking. The ADB has also sponsored CAR participation in the 3rd World Water Forum in 2003. Through the SIC-ICWC, it has also been active in follow-up regional management of shared watercourses, including components related to the 1998 Syr Darya Framework Agreement and management of the Chui-Talas Basin. Furthermore, it also has country-level investments/loans in support of water resources ministries/committees in all CAR countries except Turkmenistan, which target conditionalities related to irrigation management and expansion of rural water supplies.

The ADB has several major irrigation rehabilitation projects underway. They include the:

- Ak Altyn Agriculture Development Project in Uzbekistan (US\$36 million)
- Amu Zang Irrigation Rehabilitation Project, also in Uzbekistan (US\$73 million)

¹² Notes of meeting with WB Country Manager and Staff, Kazakhstan November 2004

¹³ www.worldbank.org, www.ifc.org and www.ida.org data pages for loans to countries in the CAR

- Agriculture Area Development Project in the Kyrgyz Republic (US\$36 million)
- Agriculture Rehabilitation Project in Tajikistan (NA)

The Ak Altyn Project is typical of ADB projects in the irrigation sector. The loan finances the rehabilitation of on-farm and inter-farm drainage facilities and the repair, as necessary, of the irrigation system. New water control and measurement structures are being built. WUAs are being formed and a pilot demonstration farm is being set-up. The project is also providing a set of farm machinery and equipment for maintenance of irrigation and drainage works, farm roads, and land leveling. Loan conditions include an agreement by the government not to increase procurement quotas for cotton or wheat, an assurance that farmers receive advance payments on-time, and an agreement to review prices annually to ensure that price adjustments fully reflect inflation rates and changes in international border prices. The projects in the Kyrgyz Republic and Tajikistan do not require these conditionalities, but they are similar in other terms.

In the power sector, the ADB is financing the Tajikistan Power Rehabilitation Project and, in the same country, a technical assistance activity to prepare a hydropower development strategy. The Power Trade Relations Agreement (PTRA), involving a \$70.0 million loan for rehabilitation and upgrade of transmission facilities in both Uzbekistan and Tajikistan has been held up for two years due to disagreements related to open access of electricity trade that would benefit Tajikistan. The ADB is also funding technical assistance projects for the upgrade of the billing and collection system and accounting and financial management procedures of Barki Tojik, the Genco for Tajikistan.

The ADB has also proposed to establish a forum of electricity regulators to: (1) share regulatory experiences, (2) build regulatory skills and conduct training programs for members and stakeholders, and (3) cooperate to harmonize electricity regulations which was approved by CAREC. It has agreed to an action plan where it will start consultation to develop a draft MOU between CAR countries regarding the identification of shared goals, objectives, and institutional arrangements to establish the forum. Once established, the regulatory experts will consider the draft MOU during their next meeting in June 2005. The agreed upon MOU will then be submitted to the member governments for review and comments to develop a regional consensus.

Project agreements for the Uzbekistan-Tajikistan Power Transmission Modernization Project funded by EBRD and ADB were signed. Negotiations for a power trade relations agreement (PTRA) are still ongoing, once signed this will clear the way for loan disbursement. A loan agreement for the first Kazakhstan North-South Transmission Line Project partially funded by EBRD was also signed.

European Bank for Reconstruction and Development (EBRD)

The EBRD is an active investor in energy projects in the CAR. It is providing funding for key transmission segments (e.g. the first phase of second North/South 500KV line across Kazakhstan – capacity and grid stabilization) and lines to new loads (e.g. the Jorrey and Kumto Gold Mines).¹⁴ It is also actively supporting coordination and cooperation associated with the Power Trade Relations Agreement (PTRA). Its associated loans are committed but not released for transmission lines and SCADA for a line from Tajikistan through Uzbekistan

¹⁴ From Team meeting with EBRD in Uzbekistan November 2004

due to Uzbekistan not meeting conditionalities related to movement toward agreement by member states on the PTRA. The EBRD is also reviewing and supporting small hydro and energy efficiency projects. Before problems arose associated with working with Uzbekistan, the EBRD had invested in upgrades and the reconditioning of hydroelectric units on the Syr Darya in Uzbekistan. It has also indicated that it would be interested in an investment in a Tajikistan to Afghanistan transmission facility.

The following are some examples of EBRD support to the region:

- **Uzbekistan**

The EBRD is coordinating/hosting monthly meetings with the economic attaché to discuss the PTRA. At the October meeting in Dushanbe it was acknowledged that CACO is the place to resolve economic issues associated with the establishment of a single market as PTRA was negotiated three times but each time the Uzbeks retracted their support.

The EBRD would loan 50 million Euros for transmission line upgrades. Since April there has been a shift toward regional perspective. EBRD is doing a ten million Euro project to rehab potable water pumping stations in Tashkent.

- **Kazakhstan**

It is providing support for negotiations associated with the Power Trade Relations Agreement (PTRA)

The EBRD is financing 270 km of the 1160 km of the second North South 500kV transmission lines. The balance is planned to be funded later.

Islamic Development Bank (ISDB)

The ISDB maintains close relations with IFIs operating in the CAR region, including the World Bank, the Asian Development Bank, the European Bank for Reconstruction and Development, mainly through co-financing of projects. The countries in the Central Asian region joined the ISDB after the collapse of the Soviet Union. Kyrgyz Republic joined in November 1993, Turkmenistan in November 1994, Kazakhstan in November 1995 and Tajikistan in November 1996.

The ISDB also works closely with the UN agencies, FAO, IFAD, UNCTAD, WTO, OIM, ECO, etc. The ISDB has co-financed the following water/energy projects along with IFIs:

- Power Rehabilitation in Tajikistan (ADB)
- Rural Water Supply project in Kazakhstan (ADB)
- Dushanbe Water Supply in Tajikistan (World Bank)

4.3. Assessment of Donor and IFI Programs

4.3.1. USAID

AEAI Team observes that U.S. assistance programs in the CAR have been highly regarded by most government officials. Many officials particularly appreciate the work that USAID provided to help the CAR countries conclude the 1998 Framework Agreement and, although less contentious than that agreement, the Parallel Operating Agreement in the power sector. Many officials interviewed also recognize that developments since 1998 have compromised the effectiveness of the Framework Agreement, and they support changes that would strengthen its enforcement mechanisms.

Until the 1998 Framework Agreement is modified or it is entirely replaced with a new agreement, it is expected to remain in place and will likely form the basis for initial attempts at negotiating a new agreement. Given the previous success of USAID in brokering the original agreement, many officials in the region are asking for renewed USAID assistance in developing a more sustainable agreement or arrangement to replace the original deal. However, their request for this type of assistance from USAID may be difficult to achieve because the focus of USAID support efforts to the region shifted in emphasis in 2000 from holding national dialogues on critical policy and institutional matters to the demonstration and testing of policies and regulations. This included the development of replicable models of integrated resource management, training of natural resource managers, working with regulatory agencies, and supporting their independency and transparency).

The recently initiated program emphasizing the development of sustainable WUAs is apparently an outgrowth of the pilot project WUA work that was done by NRMP during the period 2000-2004. Thus, the pilot projects may have been successful in convincing USAID of the need for continuing, on a wider scale and with greater funding, the WUA pilot and demonstration project activity in the CAR. The Team readily endorses the WUA program as an important component of the effort in the CAR to improve on-farm water use and associated cultural practices leading to higher yields and increases in agricultural output. Demonstration projects conducted by USAID specialists working on the WUA program report savings in irrigation water use from improved irrigation practices of 25-75 percent and improved yields of a minimum of 25 percent.

Specialists working on the USAID WUA program told the Team that, with the possible exception of the On Farm Irrigation Project (OIP) in the Kyrgyz Republic (discussion of OIP program is given below in 4.3.3), both the WB and the ADB have much “coarser” approaches to the organization of WUAs than does either USAID or IMMI. In the week before the AEA Team arrived in Tajikistan (mid-November), the ADB had dismissed 90 percent of their staff working on WUAs because of their failure to go into the field to do the organization work. As one member of an IFI suggested to the Team, the banks are good at coming up with a loan but not so good at sustaining interest in institutional change. The IFI irrigation improvement projects tend to be engineer driven, focused on the required structural rehabilitation of canals and other major infrastructure, and less attention is given to organization of farmer groups and improvements in irrigation practices.

Both the NOPI and DSS components of the TWEP appear well conceived and justified. NOPI is in the process of achieving a portion of the accomplishments envisioned for it -- providing assistance in the operation of the hydropower facilities at Toktogul and the

downstream plants on the Cascade. Both tools will contribute to the improvement and stabilization of management of the segments of Syr Darya River basin given any scenario of regional cooperation, but they are not complete models because they do not cover all seasons and do not apply to the entire Syr Darya river basin. The availability of better planning data will likely result in fewer conflicts between the parties and better coordination between them. In addition, it has been indicated that the model has the potential to increase hydropower output from the Cascade by ten percent. However, the intention to use the model to assist in development of operating rules for Toktogul remains unfulfilled, and the decision to use it more extensively is awaiting USAID funding approval. TWEP has submitted to USAID its suggested work plan for FY 2005, which includes new subtasks that are designed to assist in the further development of the DSS and NOPI management tools for the lower Syr Darya River basin. The accomplishment of this task is supported by multiple CAR host country organizations, and it was initially the intent of TWEP as one of the project tasks. However, currently the management tool has only been designed for Toktogul reservoir.

Representatives of the World Bank anticipate that NOPI will be a useful tool that can be used in future discussions within the WEC forum as it seeks to modify or negotiate a replacement for the 1998 Agreement.

There is not convincing evidence that DSS is being used effectively by the BVOs. Discussions with personnel from the DSS program occurred at the end of the visit to Tashkent after meetings with the Syr Darya BVO. The BVO Head and Deputy Head did mention the availability and use of models, but he mentioned their application in the context of the development of a model for the BVO and the entire Naryn Cascade -- and not just Toktogul. The AEAI Team inquired of an independent interviewee, in Tajikistan, whether Tajik experts are using the DSS that was developed by USAID, and the answer was "yes." It is uncertain whether the DSS in its current stage of development and application has been or is in the process of, accomplishing its potential for improving management of the Syr Darya.

Thus, it may be too early to assess the program of evaluating alternatives for sharing of O&M costs with farmers. This time seems to be a good opportunity to introduce policies and associated legislation supporting charges for water, a policy that nearly every economist would support. However, recognizing the plethora and complexity of the many state controls in the agriculture sector, impacts from implementing pricing policies may not be clear because they are difficult to measure. An indication of the relative success of the program, however, may be that the canal automation project that has been identified by the Swiss who are seeking to replicate its activities but on a larger scale. During interviews, representatives from the BVO Amu Darya requested that USAID consider supporting a similar canal automation project for the Amu Darya command area.

Thus, although canal automation seems widely accepted, the economic return from this type of intervention is less clear. Certainly, the tail water problem exists on many canals, and canal automation can correct that problem. Recording and monitoring of canal discharge, also a feature of the intervention, may be sufficient to capture most of the benefits while still achieving a cost savings. It was learned that the Swiss are intending to assess the economics of canal automation as a part of their pilot studies.

USAID has for some time been supporting the installation of river gauging stations. BVO Syr Darya requested that this support continue, and they identified several locations where an upgrade in stations would be desirable. The need for adequate river discharge measurements

are essential for effective management of the region's water resources; -- for example, resulting in the release of water from storage when flows are insufficient or in the sharing of water shortages during periods of drought.

There is insufficient evidence, however, to determine whether water management has improved in the region as a result of the installation of gauging stations and communication upgrades that have been funded by USAID. The sharing of river measurement data is a problem; for example, Uzhydromet, Tashkent complained about the lack of data from the Kyrgyz Republic and Tajikistan, which, although unfortunate, may continue to be the case until a permanent agreement on storage releases is reached. This apparent failure of communication between agencies within the same country to share hydrologic data is counterproductive.

Finally, although still ongoing, the Loss Reduction Project in Bishkek has already realized its stated objectives. It has successfully illustrated to the distribution company and others in the Kyrgyz Republic that the theft component of non-technical losses of electricity is very high, seemingly much higher than officials of the distribution company had previously realized. Company representative indicated that greater emphasis would be placed on improvements in metering in the future. The project provided ample statistics regarding levels of electricity consumption and, by association, revenues before and after the installation of improved meters. However, project results have illustrated that theft of service problems cannot be fully solved by metering alone particularly in instances where the theft of service is in part due to the meter reading process itself being compromised by collusion between the meter reader and the customer. New meters (unless much more expensive automated remotely read metering is used) alone will not solve this sort of problem. In addition, the small hydro pilot study is still ongoing. The study has provided numerous insightful lessons to its sponsors, and thus, it has proven valuable. For example, the project has already shown that turbines for small hydro facilities can be manufactured economically at a shop in Bishkek. If the project has not already done so, it may be useful to share experiences learned with the Aga Khan Foundation in Tajikistan who has installed thirty-one mini-hydro projects in Tajikistan and (two or three) in Afghanistan.

4.3.2. Swiss Agency for Development and Cooperation (SCD)

The Swiss government has been supporting a program to improve canal automation, and they have focused on three specific canal commands in the Fergana Valley. The program is still in its initial stage; and, therefore, it is too early to measure the program's success in realizing its objectives. Similar to the USAID program, however, government organizations responsible for the operation and management of the canals will likely welcome support from the Swiss government. SDC proposes to undertake a review of the impacts of specific projects and compare the projects' actual performance with a scenario in which the projects were not undertaken in an effort to make a case for the more widespread use of the canal automation concept. It is less certain, however, that IFIs will pick up the automation concept and include it in future loan projects for irrigation improvement works.

Another SDC collaboration is with Aga Khan Foundation and its Pamir Energy Project. This project has several unique features, not the least of which is the involvement of the Aga Khan Foundation, better known as an NGO -- (one of the most attractive features of the project is its approach) and thus combines private investment with public investment. This is a model that is worth exploring in other situations in the region where the private sector

perceives the risk too high to warrant local investment. A location where the model may be directly applicable is Afghanistan, where it was indicated that the Aga Khan Foundation already has a limited program. The apparent short-term success of the public/private investment model reflected in the Pamir Energy Project itself will be confirmed by further years of successful experience by the company.

4.3.3. International Finance Institutions

World Bank and ADB lending programs presently have provided significant support to irrigation drainage rehabilitation and improvement projects in the region. The IFI loans for irrigation projects normally include a WUA component, but the attention given to this component of the work appears not to be as great as that given to the major rehabilitation works. The prevailing belief is summed up in the World Bank report for the Syr Darya Control and Northern Aral Sea Project wherein it states that “it would take a long time to develop effective WUAs” To further examine the success of programs of the IFI’s relative to WUA’s, the Team requested the post-project assessment report for a recently completed irrigation scheme in Kazakhstan that included WUA’s as a component. However, that appraisal has not become available within the time frame of this assessment.. Never the less, based on observations of those in the field organizing farmer groups as well as the reported upheaval in the ADB Tajikistan Project, the Team concluded that the IFI programs to organize WUAs are, in general, not as successful as the loan components directed to the rehabilitation and improvement of major irrigation and drainage infrastructure.

The On-Farm Irrigation Project (OIP) in the Kyrgyz Republic executed by the Department of Water Resources and funded by the World Bank appears to be an exception to the general rule of slow and halting development of WUAs. That program, started in 2000, had registered 350 WUAs by 2004 and had in place an institutional support structure in 26 districts for the further development and strengthening of WUAs. The WUA Support Unit (D-WSU) at the district level in the Kyrgyz Republic is particularly critical in the program. Each D-WSU is staffed by a WUA Support Specialist, Water Management Specialist and an Engineer who have, among other duties, the responsibility for training of WUA irrigation staff in the skills needed to operate and maintain their irrigation systems. During the first three years of OIP, some 11,000 WUA irrigation staff has attended the training programs of the D-WSU’s. The program is well underway to accomplishing its objective of the formation of in excess of 500 WUAs, covering nearly the entire irrigated area of the country. More importantly, the program includes the development of the necessary support institutions at the district, province and center to ensure the long-term sustainability of the WUA program in the Kyrgyz Republic¹⁵.

Although the support has not necessarily been large in monetary terms, possibly the most important program that the IFIs have supported in the region has been the WEC. The prospects for the WEC and possible future roles for USAID related to the WEC are discussed in Section 5.

¹⁵ Information from forthcoming paper by Sam Johnson, Private Consultant and Joop Stoutjesdijk, Irrigation Engineer, World Bank “WUA Development and Strengthening in the Kyrgyz Republic”

4.4. Russian and Chinese Regional Investments

From a development standpoint, the “three thousand pound gorilla” in the Central Asian region is, and will increasingly continue to be, a duopoly consisting of Russia and increasingly China. All regional development investments by USAID, other bilateral donors, and IFIs should be undertaken considering the increasing role and influence of their investment in the region.

4.4.1. Russian Investment and Geopolitical Involvement in CAR

Having seemingly lost its superpower status, Russia still remains an important player in world and Former Soviet Union (FSU) politics. Recognizing increased levels of U.S., European Union, and Chinese influence in Central Asia, Russia is clearly aware that it cannot afford to be a bystander to a changing military and strategic balance of power in its backyard. Safeguarding its economic and security concerns in its former sphere of influence has always been a major objective for the Russian government. Its recent bilateral and multilateral activities in the region should be recognized as an effort to use its energy and economic clout as leverage in shaping and implementing its strategy in the CAR region. Recent Russian development activities and initiatives in the region should be recognized as an effort by its government to preserve its strategic space in a part of the world that it perceives as its buffer zone. Its efforts to preserve this space are being achieved by an incremental enhancement of its interstate relationships, using a plank of "stability" rather than "democracy."

It is important to highlight that, traditionally; Russia has considered the CAR region as a strategic buffer against outside threats. Consequently, many strategic interests compel Russia to retain Central Asia within its sphere of influence. To achieve these interests, Moscow's major objectives in the regions could be summarized as:

- Helping to transform the Central Asian Republics (CAR) into politically and economically viable states with friendly policies towards Russia.
- Strengthening Russia's role in the system of intergovernmental political and economic relations.
- Extending and further institutionalizing integration among the member states of the Commonwealth of Independent States (CIS).
- Securing Russian economic interests in the region.
- Maintaining Russian hold over regional energy resources; which include Caspian Sea oil and establishing transportation routes that will be advantageous to Russia.
- Countering the threat of religious extremism, while encouraging the prevention of drug trafficking and arms smuggling.
- Ensuring Central Asia's ecological security, especially concerning environmental disasters in the Aral and Caspian Sea.
- Protecting the rights of Russians living in the region.

Russia's significant economic and political interests in Central Asia are clearly being played out through the large government and quasi-government business operations of Gazprom and RAO UES, Russia. Most of the CAR regional energy distribution network (including coal by rail) travels through Russia and FSU countries (including Ukrainian ports of Odessa and Feodosia) through outlets connecting to Russia and onward to international markets.

Consequently, through this network Russia can exercise considerable control over the economic value of these energy assets to the CAR. In addition, with tighter business and financial linkages with and significant investment in the associated CAR energy entities by the Russia's huge quasi-state energy income controlling transmission entities, this control element is clearly intended to continue and increase.

Current significant Russian regional investments in CAR already include both transmission (500 KV North-South grid in Kazakhstan and Caspian Pipeline Consortium's – CPC-Pipeline) and energy plant/trading (JV KazRosGas and the Sangtuda and Rogun hydro plants in Tajikistan as well as the commitment to Kambarata feasibility study in the Kyrgyz Republic). These economic interests are well known, and they involve especially strategic links with Kazakhstan.

In order to protect its economic interests in the CAR region, Russia has kept a tight rein on the states it considers to be most critical. For example, Russia has vital interests in the oil and gas complexes of Central Asia. Whereas the CAR region possesses enormous energy reserves, it becomes important for Russia to pursue its own economic advantages while simultaneously fulfilling a strategic role of ensuring Russian control of those oil and gas production and transportation facilities, especially in bordering countries of the FSU. In addition, Russia seeks to avoid its own economic isolation by building new pipelines across its territory. Russian political analysts tend to look at their country as a status quo power in Central Asia that prefers a gradual transformation as a choice between a rapid transition to democracy and maintaining stability. They prefer a process of gradual transformation underscored by stability in the region, rather than supporting attempts to impose Western-style democratic models that are alien to these states.

Kazakhstan is the single most important country for Russia, both politically and economically in the region. It is the home of significant ex-Soviet defense/industrial facilities, including the Baikonur space launch complex and a nuclear weapons testing facility. Kazakhstan is also the second largest oil producer after Russia in the former Soviet Union. Thus, maintaining control over its energy resources and their means of transportation provides Russia with tremendous strategic and economic leverage. Russia is renewing the lease deal of the Baikonur space center for another fifty years; and it is also discussing Kazak gas exports to Europe through Gazprom.

Russia has also developed significant military and economic ties with the Kyrgyz Republic by opening a military base near the city of Kant. In addition, USSR debt-for-asset swaps in the Kyrgyz Republic, Kazakhstan, Tajikistan, and Uzbekistan also tie Russian interests to local industry and the need to improve energy source, availability, reliability and stability. In Tajikistan, Russian ownership of aluminum processing assets also focuses their interest towards expansion of low cost hydroelectric energy assets. The presence of these processing assets in Tajikistan would also enhance and complement the potential export of coal to Russia by filling the returning train cars with bauxite for processing in Tajikistan.

Similarly, there are large enterprises in Russia that are dependent on cotton imports from Uzbekistan. Following the U.S. denial of aid to President Islam Karimov of Uzbekistan due to his government's dismal human rights record, Russia seized upon the opportunity to formalize economic and military agreements with Uzbekistan. These agreements are likely to, enhance not only its standing with Uzbekistan, but to enhance its standing in all of Central Asia. Under the terms of the agreement, the two countries are committed develop a wide-

ranging security system that encompasses ministries of defense, interior, foreign affairs and security councils. Tackling terrorism, weapons of mass destruction, narcotics trade, and organized crime are some of the stated objectives of this partnership.

These events have been followed by a breakthrough in relations with Tajikistan. A recent bilateral agreement between the countries will create the establishment of a Russian military base, establish border cooperation wherein Russia will assist Tajikistan in development and performance of its border guard structures, and provide military aid. Furthermore, Russia's Federal Security Service will establish a border operations group to coordinate such a partnership and assist Tajikistan in guarding its border. At the signing ceremony in Dushanbe, Russian President Putin stressed that a Russian military presence in Tajikistan will guarantee Russian investments and overall stability in the region.

Concerned with the growing American and Chinese influence, and given its own strategic interests in the region, Russia has been incrementally enhancing its own presence and activities in the region with the intention of expanding, consolidating and further strengthening its relations with CAR. Under President Putin, Russia is aiming to establish a stronger position in the region, which includes greater emphasis on cooperation in the energy, and military sectors, which is signified by a series of bilateral and multilateral agreements into which Russia has recently entered.

Beyond its economic and military bilateral engagement, Russia is enhancing its hold on CAR through the Collective Security Treaty (CST), now transformed into the Collective Security Treaty Organization (CSTO), thereby making Russia a dominant player in this arrangement. Russia is also forging closer ties with the Shanghai Cooperation Organization (SCO) as a means of keeping further Chinese influence in check. As part of its increasing security interaction, Russia has promised to hold large CSTO exercises in Tajikistan during the first half of 2005. Interestingly, Russia has lately hardened its approach towards China. For example, in the October 2004 meeting of the SCO, it vetoed a proposal to establish a free trade area in the region suggested earlier by China, a move that was endorsed by other members of the organization. It appears that Russia is concerned about Beijing's growing economic and military influence, which would likely to subvert its own interests given China's increasing economic clout.

Another prong of Russia's multi-pronged regional engagement strategy has been its formal joining of the Central Asian Cooperation Organization (CACO) on October 18, 2004. Set up in 1994 as a purely economic organization, CACO is now being transformed into an all-encompassing regional setup with an agenda that includes political, economic and anti-terror issues. Full membership for Russia in CACO is certainly part of an overall Russian strategy of engagement at the highest levels in CAR, and, thus, it allows Russia to exercise a greater level of influence/control in the region than its most significant regional influence competitors, the US and China.

Despite moves made by the U.S. and China to exercise greater control over energy routes, Russia still has an edge on this front. Most of the existing Central Asian pipelines pass through Russia. At present, Russia contributes nearly 15 percent of the oil supplied to the U.S., and according to Russia's Minister of Economic Development and Trade German Gref, Russia can start to freely compete with the Arab oil-producing countries to supplement the American market.

4.4.2. Russian Business and Quasi-Government Entity Investments

Water and energy investments in the CAR region by Russian companies and quasi-state entities have been significant over the last few years. Russia's investments total in the region (if the full potential Kambarata investment is included)¹⁶ exceeds \$4.9 billion. In fact, this amount may represent only a partial accounting of its investment in the region since the general lack of transparency in its reporting of debt-for-asset swaps already made by Russia for energy, industrial and transmission assets in the Kyrgyz Republic, Tajikistan and Kazakhstan may be underrepresented in this figure, thereby making it very conservative. In fact, the actual level of Russian investments occurring during the period of projected development covered by this assessment report is very likely to be much higher than this amount. This projection is made with some confidence considering that the CEO of Gazprom recently accompanied Russian President V. Putin on his travels to Pakistan where tentative agreements on gas transmission and supply were made. In addition, since not all of these proposed project investments are being made based upon clear economic principals -- but rather on a mix of sound investment strategy and perceived geopolitical benefits -- some of these projects will be accomplished without regard to the standards of return-on-investment or CAR economic benefit that previous water/energy assessments of the region may have assigned to them (e.g. Kambarata I and II). In the case that such a gas supply deal is culminated by Gazprom with Pakistan (as is highly likely), the obvious supply source will be from the CAR region. In instances where gas is now used for internal electricity generation self-sufficiency in CAR, it will be highly likely that hydro-electric generation will need to be used to substitute for such existing and economic growth related gas use in CAR. One potential pipeline supply route noted by the Pakistani government was through Afghanistan via Kabul.

The following projects represent a partial listing of investments made by Russian organizations in the CAR region during the last few years:

- **RAO UES:**
 - In Kyrgyz Republic -- concluded an agreement to invest \$350 million in the Kambarata #2 hydroelectric station (360 MW) and to develop a larger investment package for the Kambarata #1 (1600 MW) hydroelectric station project by 2007.¹⁷
 - In Tajikistan -- formed a consortium to finance the completion of the Vakhish cascade power stations below the Rogun Dam on the Amu Darya River. Also, agreed to possible participation in the combined debt-for-equity swap and investment package of \$560 million (\$299 million debt for equity)
- **LUKOIL:**
 - In Kazakhstan -- The Caspian Pipeline Consortium is the builder and operator of a new 1510-kilometer oil pipeline linking Tengiz, Kazakhstan with the Black Sea port of Novorossiysk, Russia that will be able to deliver 28.2 million tons of oil per year. The consortium is considering a future expansion in capacity, which could increase this capacity to 67 million tons of oil per year. Russia is a 24% owner, and a LUKOIL venture company holds a 12.5% ownership position in this \$2.6 billion project.

¹⁶ Estimated by the World Bank to be \$1.5 billion -- Water Energy Nexus in Central Asia, World Bank, January 2004 pp.v

¹⁷ Financing Russia's Central Asian Expansion, Central Asia-Caucasus Analyst Bi-weekly Briefing 20 October 2004 pp. 7-8

- In Uzbekistan -- A gas producing Russian/Uzbek joint venture consisting of Russian based Itera (45%), LUKOIL (45%) and UZBEKNEFTEGAZ (10%) will jointly develop the Bukhara and Gissar gas regions. The regions are estimated to contain reserves of 230 bcm of gas, and the partnership has committed to invest \$720 million over the next 25 years. The LUKOIL investment was partially underwritten by IFC.
- In Kazakhstan– LUKOIL has committed to a 10% equity investment in the Tengiz Oil field joint venture with primary ownership by Chevron (50%) Mobil (25%) and Kazakhstan (20%) for a producing field of 199,00 bbl/d, with projections for near term capacity of 240,000 bbl/d. The total investment is projected to be \$20 billion over 40 years. LUKOIL's current investment is \$575 million.
- **GAZPROM:**
 - In CAR – entered into an agreement to modernize and expand the Central Asia-Center gas pipeline which links gas fields in Kazakhstan, Turkmenistan, and Uzbekistan with the Russian network. This commitment is projected to be \$2 billion.¹⁸
 - In Tajikistan – entered into an agreement to develop the Rengan and Sargozon gas fields in Tajikistan where the Rengan field alone is estimated having a reserve of 30 MCM of gas.

4.4.3. Chinese Investment and Geopolitical Involvement in CAR

Also a neighbouring country, China, is increasingly investing in Central Asia. As noted in the AEAI Team's meetings in Uzbekistan with Uzbekenergo representatives, China plans to manufacture electric meters under license in Uzbekistan in order to get this alignment. On the energy distribution side, they are also moving to develop alternate pipeline routes to bypass Russia's energy controlling distribution system. This investment will likely exceed \$2.6 billion, because it requires nearly 1000 kilometers of pipeline just to get to the railhead on the China border. It compares very favourably to the Caspian Pipeline Consortium's 1500 kilometers of pipe constructed over more favourable terrain at a cost of over \$2.6 billion¹⁹.

Shanghai Cooperation Organization (SCO). In spite of relatively good relations with the U.S., Russia remains suspicious of the long-term consequences of an increasing American presence and influence in the region. Russia would prefer to see the CAR region not overly aligning itself with Western interests. Military and economic linkages -- including energy -- remain a key concern to Russian national security interests. However, it is also clear that Russia does not want a direct confrontation with the U.S. over issues in the CAR region. Consequently, Russia continues to seem likely to work out a mutually acceptable and accommodative agreement with the U.S. in the region

Partly reflecting these sentiments, the SCO was formed in 1996 as part of a confidence building measure between China and the CIS states it bordered. Under the terms of the first agreement, all five countries are required to remove strategic warplanes, heavy armor, and some troops back 100 kilometers from the border. But China and Russia have also pushed the SCO to counter increased U.S. influence in Central Asia since the 11 September 2001 attacks on United States, which subsequently led to the U.S. deploying troops to the region for operations in neighboring Afghanistan.

¹⁸ Gazprom.com News August 18, 2003

¹⁹ Caspian Pipeline Consortium press release

The agreement to promote the cooperation in trade, science, and technology and humanitarian projects was first approved in Beijing in September 2004 and resulted in the establishment of the SCO.

Kazakh Prime Minister Daniyal Akhmetov and Chinese Premier Wen Jiabao said their countries would, in a matter of days, start the construction of a pipeline from oil-rich Kazakhstan to China, where rapid growth has made it hungry for energy. Akhmetov praised the achievements of the SCO: "Kazakhstan considers its participation in the Shanghai Cooperation Organization a priority task and expects significant results from the plan for multilateral economic cooperation."

4.4.4. Donor Cooperation with Russia/China

Given that the thrust of the Russia/China investment in the CAR region is focused primarily on energy, Western donors should consider this situation in evaluating energy sector development opportunities and make an attempt to leverage the considerable influence of these Russian and Chinese energy sector investments. In general, Russian investments in the CAR region (including energy consuming assets acquired in the various debt-for-asset swaps) -- should work to enable such cooperation. Consequently, donor efforts aimed at improvements in expanded energy trading -- including improved transmission capability and reduction in losses in distribution that would increase the amount of energy available for export beyond CAR -- would likely be collaboration/cooperation opportunities of interest to the Russian "donors" and investors. Use of such leverage can be seen through the lens of the recently completed CPC project connecting Kazakhstan's oil fields to the ports of the Black Sea. The recent IFC investment in LUKOIL's stake in the international consortium developing one of the largest supply fields for this pipeline can be seen as a CAR energy sector cooperation and collaboration enhancing move by the World Bank and supportive of its emerging relationship with CACO.

It is apparent, that, lacking other donor or IFI actions, energy sector investments by Russia (including its commercial and quasi-governmental entities) including the proposed build-out of the planned hydro generation capacity, would be greatly constrained by transmission capacity, grid control and operations limitations, and a non-regional power market. Should the Russian government be motivated (as we are thinking they are) to correct this infrastructure limitation for its own reasons but without donor (USAID) participation in the development of energy market programs and policies, it can be expected that energy will dominate water in this version of possible outcomes for the water and energy nexus.

5 RECOMMENDATIONS FOR FUTURE ASSISTANCE

AEAI's selection and prioritization of suggested activities that are presented in this section of the report for consideration by USAID/CAR in their future water and energy sector assistance programs to CAR region countries has used an informal evaluation process that has included the following steps:

- 1) Setting forth a strategy proposal for recommendations made, and
- 2) Identifying and selecting potential development opportunities based on ongoing work of USAID and other donors in the CAR, assistance activities suggested by officials and donors interviewed and previous experience of the Team members.
 - a. Evaluating the options based on criteria presented in the SOW supplemented by information available from pilot studies and experience of the interviewees and/or Team members with the option under consideration, and
 - b. Prioritizing the recommended activities based on the evaluation criteria and judgments of Team members.

In the background and strategy meetings with USAID and the World Bank staff prior to the Team's beginning its trip to CAR it was recognized by senior staff personnel at both USAID and the World Bank that this assessment had set a very high expectation for the depth and breadth of programmatic review and assessment to be accomplished and that this assessment was being conducted on a very short timeline. In addition to the trip to Washington DC and the meeting there with USAID and the World Bank, the project conducted over sixty meetings and interviews in four CAR countries and at six different cities. In addition, a brief dinner meeting was held with USAID/Kabul officials while in Dushanbe and with EBRD in London, England wherein they presented their strategy for support of the energy sector in the CAR.

While this seems like a lot of opportunities for information gathering, some areas of interest to the Team and possibly of value in selecting and prioritizing of the recommendations provided in this report were not conducted due to the time allotted for this assessment and the associated travel schedule required to visit all the CAR countries in this assessment in the time available. Unfortunately, this also meant that there was little time to assimilate and assess information gathered from the meetings and the over forty reports and reference documents provided to the Team, prior to the preliminary findings being presented for discussion in the format of an expanded trip report during the Team exit meeting in Almaty at the end of their CAR visit.

It is our hope that, considering the short time frame allotted to us for this important and timely assessment, with the submission of this report we have met or exceeded the expectations and needs of USAID. We also offer our thanks for the contribution made by USAID staff both during the meetings in Washington DC and CAR and through their comments and suggestions made subsequent to the data gathering travel phase of this assessment.

The identification of selected development opportunities that meet the proposed strategy set forth below; a summary of the evaluation and listing of collaborative options and opportunities of selected development options is presented this Section of the report.

The Recommendations of Section 5.2 and 5.3 are sequenced in a priority order and annual funding limitations can simply be applied in a top down manner to this list.

A 2006 –2010 funding chart and narrative is provided in Appendix E Answers to SOW 13 Questions.

5.1 Strategic Direction

In the past five years USAID's CAR strategy can be characterized as follows:

- Shifting focus of USAID efforts from holding national dialogues to demonstrating and testing policies and regulations in response to successes in drafting policies not being matched by successful implementation.
- Placing greater focus on the development of replicable models of integrated resource management and training of natural resource managers.
- Giving specific attention given to working with regulatory agencies, supporting their independence and transparency.

During this period of USAID assistance in CAR a number of significant demonstration and pilot projects were conducted to show what the implementation of policy changes (recommended earlier) could produce and prepare the way for these policy transitions in the various operating and implementing entities (e.g. Water Users Associations, Improved Canal Management and Rehabilitation, Optimizing Water Distribution, Improving Irrigation Water Supply, Improving Communications, Distribution Metering, Energy Efficiency, and Models for Improved Management and Decision Support).

Also during this period, the policy work done with USAID support during the prior period of support (pre-2000) began to take root (e.g. energy market in Kazakhstan) and, in some cases, limitations not anticipated at the time of implementation (e.g. 1998 Framework Agreement) surfaced. Consequently, current timing is excellent to look ahead toward the next five years of development support in CAR.

It is proposed that the following strategy be considered for the next five year period:

- Shift focus of USAID efforts back to regional and national dialogues and agreements in response to emergence of CACO and WEC enabling entities from simply demonstrating and testing policies and regulations through demonstration projects and pilots,
- Continue to use demonstration and pilot projects to enable and demonstrate validity of policy recommendations made at the WEC level,

- Enable specific change drivers to enhance power market operations and speed engagement of other CAR countries in reforms successfully demonstrated in Kazakhstan,
- Place focus on energy security enhancing projects (demonstration, pilot and rollout) in the Kyrgyz Republic that have immediate impact to reduce or offset winter peak electricity demand and enhance the potential for successful privitiation of the distribution sector, and
- Leverage considerable IFI interest and potential funding, provide expertise and coordinate the expansion of transmission systems within CAR and to Afghanistan to the South. Recognize and use the considerable Russian investment in hydro generation capacity development in Tajikistan and the Kyrgyz Republic to feed the Afghanistan transmission system in the mid-term.

5.2 Other Donor and IFI Activities

As described in greater detail in Section 4 of this report, both the World Bank and the ADB are providing substantial assistance in the water and energy sectors. The World Bank is active in national projects, bilateral solutions, and the WEC. According to the Regional Coordinator for the World Bank in Almaty, WEC is the most important of these programs. Major national projects currently ongoing in water and power are: The EBRD is active in the electric energy sector in the CAR, especially in transmission. Although the EBRD has limited ongoing activity, at least in relation to the other Banks, the Team was impressed by their apparent interest in new loans in the power sector. Possible project loans in Tajikistan include both the Sangtuda and Rogun Hydro Projects and major transmission line developments. The Swiss Agency for Development and Cooperation (SDC) is the second most active bilateral donor after USAID. Like USAID, the active donors maintain offices in most CAR countries.

Programs of the World Bank of interest to this assessment are:

- WEC, lead for assistance in setup and support,
- Syr Darya Control and Northern Aral Sea Phase I Project,
- Uzbekistan Drainage, Irrigation and Wetland Improvement Phase I Project,
- The Kyrgyz Republic On-Farm Irrigation Project, and
- Kazakhstan Electricity Transmission Rehabilitation Project being funded in association with the EBRD.

Notable ADB projects are:

- The Ak Altin Development Project in Uzbekistan is noteworthy because of its conditionalities intended to improve farmer incentives and incomes by providing relief from the quota and price systems that exist in that country.
- The \$73.0 million loan project for irrigation, Amu Zang, double in size of the Ak Altin project, is to be initiated soon in Uzbekistan.
- The first irrigation infrastructure project in Tajikistan, following the standard model, was initiated in 2001 and the second irrigation loan project is scheduled for 2005.

The EBRD has provided loans for major transmission schemes in Kazakhstan and, the

- First stage of the Kazakhstan North South (second 500 kV link) Power Transmission Project
- Transmission Rehabilitation Project for the CAR Grid referred to above in the World Bank projects list.

The Swiss Agency for Development and Cooperation (SDC) program content includes:

- Canal Automation Project in the Fergana Valley recently started by SDC is modeled after the Pakhtaabad Canal Pilot Project previously completed by USAID.
- A companion scheme in the same canal commands, being done in association with IMMI and SIC, includes organization of Water User Associations and conduct of field demonstrations of improved cropping techniques.
- The SDC continuation of the program to install hydro-meteorological stations
- Small scale hydro projects with Aga Khan Foundation.

Two notable projects among the smaller donors are:

- DFID assistance in design of tariff policy in the Kyrgyz Republic, and
- EU-funded TACIS project for the Talus and Chu River Basins intended to strengthen the capacity for integrated river basin management.

5.3 Government and Donor Input to Recommendations

The Team solicited input from the representatives of the various agencies visited, including government, other donors, and private entities (e.g. AES, Pamir). Some of the suggestions were not relevant to the selection process, in a few cases because they were too large, more in the nature of a loan project for the IFCs, and because they are outside the territory of the river basins under consideration in this study. In all, a total of over thirty (30) suggestions were offered. A list of the suggestions is given in Appendix B.

The most frequently mentioned suggestion offered was for USAID to re-engage in efforts to resolve the Syr Darya water use problem. Coupled with those who request a strong presence of USAID in providing assistance to the WEC (World Bank, ADB, Foreign Affairs officials in Kazakhstan and Tajikistan), there is a large sentiment in the Region for USAID to stay involved and provide assistance directed to solving the transboundary water problems. The consistency of this input should be of no surprise since many in the Region expressed appreciation for the prior assistance provided by USAID and their contractors that led to the 1998 Framework Agreement.

The second most frequently mentioned suggestion related to the creation of a regional energy market. The Vice Prime Minister in the Kyrgyz Republic characterized it best, asking USAID to help establish a Central Asia energy pool.

The top priority given by the respondents to assistance with the transboundary water problem and creation of a regional energy pool is consistent with expectations.

Other activities proposed by a number of those interviewed were:

- River basin management/planning support - including the development (enhancement and/or extension) of mathematical models to simulate river flows,
- Assistance to the distribution companies in the Kyrgyz Republic for metering and other actions required to improve their performance and mitigate winter peak power demand,
- Assistance in the design of an improved tariff policy as recommended by the Anti-Monopoly Commission, the regulator in Kazakhstan and AES,
- Need for transmission planning and/or training.

Two other less prominent opportunities for donor/IFI cooperation and collaboration were specifically mentioned:

- Assistance in undertaking policy and institutional work that will accompany the World Bank's loan to rehabilitate the distribution systems in Tajikistan; and
- Consideration for funding an energy efficiency project with the UNDP.

5.4 Evaluation Criteria

As defined in the SOW the Recommendations should, where applicable, address the following:

- Priority toward and opportunities for the recommend activity to influence policy and institutional change,
- Nature of any recommended activity, including possible constraints to the interventions recommended,
- Political likelihood of any recommended policy changes occurring, including the policy drivers which, in the contractors' opinion, will result in the incentives being created or enhanced for ensuring these changes will occur,
- Anticipated goals and results (including timeframe),
- Cooperating local counterpart organizations and/or Ministries,
- Possible cooperation opportunities with other donors and IFIs,
- Potential of the activity to leverage off other donor resources
- Alternative activities, or options, are evaluated in terms of scenarios with and without USAID assistance and the degree to which the activity can be done by others or will be undertaken by other donors in the absence of USAID.

According to the SOW, for the next stage of activities in the CAR, USAID values **opportunities to influence policy and institutional change**. This is in contrast to the most recent five-year period when, for the most part, pilot projects were undertaken.

Another criterion from the SOW is **the potential of the activity to leverage off other donor resources**. As conveyed by the World Bank and EBRD, these Banks and presumably the other banks are receptive to grant outlays for purposes of policy and institutional activities connected with their larger loans. Consistent with the SOW, opportunities of this type are of interest to USAID and provide a second evaluation criterion.

The evaluation criteria used, based upon the above summary, provides a basis for the assessment of the competing activities for future USAID supports. In the analysis presented below, the alternative activities, or options, are evaluated in terms of scenarios with and

without USAID assistance. That is, the **options are analyzed, where relevant, assuming USAID provides funding for the activity, and then compared to a condition in which it does not.** This captures the criterion of what will likely happen in the absence of USAID support.

5.5 Regional Water and Energy Policy Recommendations

Project estimates shown below are generally first year estimates and are set for the low budget (\$ 1 million annual) option to be assessed, to view the full 2006-2010 period and high budget (\$5 million annual) see, Appendix E: Answers to SOW 13 Questions.

5.5.1 CACO and WEC Cooperation and Collaboration

- **Policy Reform Impetus and Leverage:** The emergence of CACO as a leadership forum for the CAR and its powerful neighbor Russia to the North and Shanghai Cooperation Organization (SCO) with both Russia and China its powerful neighbor to the East has significantly changed the political and policy enabling landscape in CAR. The World Bank has already shifted its sails, is tacking to the CACO wind of change and will assist the CACO drive to set up and empower the WEC. The World Bank has spent significant resources analyzing the Water and Energy Nexus and Regional Energy Export Potential of the CAR countries and its linkages to the close neighbors in the region as a basis for strategy development for the WEC.

Since the CACO is a Heads of State organization, it is the best forum for gaining consensus and making real progress on CAR-wide issues, such as addressing changing/replacing/modifying the 1998 Framework Agreement.

Although USAID, through TWEP has continued to be involved in regional water use issues, the perception at the key stakeholder level is that USAID has not been engaged on this issue and even the basin water management modeling work done by USAID is generally seen as benefiting one or two countries and not the region as a whole.

- **Goals, Support Roles and Cost Estimate:** The primary goal of this recommended course of action is to engage in the process of policy formation within the context of an organization (CACO) that is already established at the Head of State level and where a focus on water and energy policy and action (WEC) is being established. The consequence of this engagement would be the most likely enabling pathway to the possibility for a revised or replaced water energy agreement based upon the 1998 Framework Agreement or a completely redrafted agreement, whichever the countries can agree to in negotiations conducted within the WEC framework. It is anticipated that the ultimate agreement, whether arrived at in the next round of negotiations or later, will have a water compensation clause acceptable to the Kyrgyz, the upstream country in control of Toktogul storage.

Although WEC has been agreed to in principle by the Heads of Government, the organizational structure and, most importantly for purposes of this report, specific activities and related needs for technical assistance are yet to be determined.

Nevertheless, based on the framework of understanding acquired by the Team, a scenario of possible USAID assistance to WEC is described. Since it is still very early in the process of establishing WEC, the description represents the Team's best judgment, assuming that WEC will "live," as one donor told the Team, and that USAID will participate in providing support.

Based on the level of interest, support and momentum that WEC already has, it seems reasonable to accept the earliest estimate heard by the Team for a startup of operations. The ADB Country Manager in the Kyrgyz Republic, who attends the WEC preparation meetings as the ADB representative, predicted that agreement to formalize the organization would be completed in March 2005. At that point, the Secretariat would be established, allowing the workshops and study tour that have been identified as early activities to be initiated.

Another factor in our expectation that the WEC may get "special" consideration is the fact that Russia is now a CACO member. Russia is making a considerable investment in energy assets in CAR, and in order to enable this investment CAR must have transmission capacity (grid expansion and controls improvements) and capability (markets and rules) that will let Russia maximize its return (political as well as financial). This means that Russia must have a way to get the CAR countries to work together on these issues in a coordinated way (one Russia can influence). The vehicle the Russian can now use to assert this influence is the CACO and the likely means for Russian to get this cooperation in the energy sector is the WEC. Although, most of the hydropower generation assets being developed by Russian interests are likely to be four to five years (or in some cases much longer – e.g. Kambarata I) before they will come on-line the framework (power exchange facilitation) and infrastructure (transmission) for this power generation capacity must be started now.

However, it should be noted that considerable skepticism exists on the part of USAID/CAR that such an early startup of the WEC will occur. This skepticism is based upon direct experience in working in the region and having heard the same sort of optimism expressed by CAR governments and interested parties on such topics in the past. The team's view is that USAID should take an opportunistic approach so that should the WEC "take off", they (USAID) should be prepared to take advantage of this momentum and the unique position the WEC holds (relative to implementation of its potential recommendations) due primarily to the fact that it is being driven by CACO, a heads of state lead organization.

The early activities recommended focus on reviewing international experience in transboundary water cooperation out of which, it is hoped, will emerge a spirit of cooperation among the participants that will eventually lead, perhaps through the forum of a working group process, to the resolution of the water conflicts in CAR. The Team, although also hoping that informed dialogue will make the difference, believes that this intervention alone may be insufficient to alter current perceptions held by the countries of their best interests. The interviews suggested that these perceptions are firmly held. Moreover, an analysis of each country's position confirmed their logic, at least from the perspective of each country viewing their short-term interest.

One means by which perceptions may be altered is to engage the countries in plan formulation of the onward development of the river basins. In this process, the countries would be jointly involved in planning for the future development and management of their common water resource. The planning process itself will require focus by each country on its long-term interests and the means, including policies, institutions and programs/projects, by which those interests will be achieved. In the longer term, almost certainly, cooperation rather than a scenario of continued conflict will best realize those interests over water use and the stagnation in development that this implies.

USAID can play a major facilitative and supportive role in this process, first in assisting with the initial activities and, if that proves inadequate, a long-term planning process that will result in a common vision for future management and development of the Syr Darya and Amu Darya river basins. The process could proceed without USAID support but, in the view of the Team, it would be diminished. The Team concluded on the basis of the evidence from the country visits, much of which has been cited above, that USAID, by virtue of its past contributions in the water sector, has a unique presence in the CAR. USAID's proven capabilities in providing required expertise would be lost to the process if USAID does not participate. But perhaps even more important, the U.S. presence or prestige would be lost to the political process that needs to accompany the technical studies. WEC functioning under CACO is effectively set up to enable the underlying technical work involved in planning to proceed in parallel with decision-making at the highest levels of the participating governments. The two processes, technical and political, are complementary and dependent on each other for change to occur. The latter process would be significantly enhanced by the U.S. presence.

Although speculative at this time, it is estimated that USAID assistance will be welcomed and critical to WEC during two time periods -the initial period of information gathering and working group discussion followed by the long-term planning process. Following the lead of the countries and the World Bank, USAID may be requested to assist with the workshops, study tours, and discussions/negotiations. The latter activity including assistance to the countries, as USAID has already been providing, would include the development of operating rules for the multipurpose Toktogul Project. A rough estimate of the possible cost of advisory support activities during the estimated 18 months of what would be considered the initial stage development is \$200,000-\$400,000 spread over the year and a half.

The second period of possible USAID involvement, should it become necessary as a part of the process of reaching agreement between the countries, would involve the preparation of long term development plans for the river basins (possibly funded by one or more of the participatory IFIs). It is estimated that preparation of a single river basin plan with associated training for knowledge transfer in support of the WEC led process is \$5 million. Development of a plan for both the Syr Darya and Amu Darya basins together would economize on resources, resulting in a total estimated expenditure on the foreign assistance side of \$8.0 million, or \$4.0 million per plan and would take some thirty months to accomplish. Although the problems on the Amy Darya appear less critical, conduct of a planning study for that river basin coinciding with that for Syr Darya is

timely in view of the development potential of the Amu Darya basin and the long-term effects of upcoming near future decisions. In addition, the Amu Darya study would draw Afghanistan into the process, important for the integration of Afghanistan with the CAR.

5.6 Regional Power Sector Recommendations

The regional power marketplace is emerging, with Kazakhstan leading the way. A clear sign of this emergence is the recent power sale by the Kyrgyz Republic to Russia by way of the CAR Grid and Kazakhstan. This power sale was not without its detractors due to the rather low unit cost per kWh delivered but since the alternative was spilling the water with possible serious damage to the spillway and receiving nothing in return the price received was “reasonable”. The Kyrgyz Republic was not bargaining from a position of strength for this particular trade and since no real power market exists they did not have the protection of a fully functional market process to find alternate bilateral consumers they had little choice but to sell at the only price offered.

To facilitate the emergence of this marketplace several energy side issues must be addressed in the near term if the full potential of CAR’s emerging energy market can be realized. There are several specific needs that can be collaboratively supported by USAID in this area of development support.

It is important to recognize the interplay of this national development for self-sufficiency with minimal to no dependence on regional cooperation. It is suggested that it is first necessary to establish a national level of confidence and then, working from a position of confidence, move to regional cooperation.

Price and regulatory reform are critical to success of energy sector developments in each country and the region. However a full-fledged regional electricity market may not be immediately appropriate in the CAR. Instead it may be necessary to evolve from the present state in two major steps. Step one would be to establish operational electricity markets in each country and step two would be development of a regional market. It is conceivable that the regional market would be based on bi-lateral contracts together with a balancing market and a transparent pricing policy to deal with transmission congestion and for the use of transmission lines. It is important that institutional and structural changes take place before competition begins.

5.6.1 Relief of Transmission Congestion/Constraints on CAR Grid

Relief of the transmission congestion/constraints that currently exists on the 500kV CAR Grid is regarded, and this also directly affects Tajikistan and the Kyrgyz Republic, as a priority intervention. The Team endorses the proposed Regar-Kuljant 500 kV line in Tajikistan as one part of the solution to this problem. The line will allow Tajikistan to move power from generators in the south to loads in the north of Tajikistan without having to use the Uzbekistan transmission system. Although this is likely to be a technical assistance activity for USAID with construction and startup funding from EBRD or ADB, completion of the line, with USAID support (see list of technical assistance projects below), has major implications for the region. The line will enable Tajikistan to enter the Kazakhstan power

market without having to arrive at difficult “mutual understandings” with Uzbekistan, a positive development for the emerging regional energy market, and will facilitate direct delivery of power to Afghanistan from generators in Kazakhstan, the Kyrgyz Republic and Uzbekistan. Associated technical support tasks are listed below. The team also endorses the completion of the second 500 kV N-S transmission line in Kazakhstan. Completion of the second north-south line in Kazakhstan will help to improve reliability of the interconnection of the CAR grid and the North Kazak-Russian interconnection. This is also likely to be an EBRD/WB funded activity and would be supported collaboratively by USAID through the application of the following technical assistance projects.

Modeling and Technical Support: There is a need for analytical tools in support of transmission system planning and operating activities. It is unclear as to the degree to which western-developed analytical power system simulation software is in use in the region or in each country. When asked, the Team was told that power flow calculations are made and that N-1 (most significant transmission system outage) system planning criteria is in use. However, no names of software were given in support of the answers and no reports were offered that would provide a basis for a definitive opinion on the use of up-to-date software. The availability of a common database for use by each country is an added goal. A survey may be conducted by USAID or another donor that would determine what types of power system simulation software are in use and, if appropriate, design a task to introduce new power system simulation software.

- **Policy Reform Impetus and Leverage:** If all transmission system planners in the region used the same power system simulation software, then there would be several policy and institutional benefits. The use of similar analytical tools for transmission system planning and operations through out the region would strengthen institutional capacity because all power system analysts would be using a common tool and associated database. It would also allow policy makers in the region to have technical information on a uniform basis about power system performance. The supply of power system simulation software could be included in loans from IFIs such as EBRD, World Bank, ADB, etc.
- **Goals, Support Roles and Cost Estimate:** USAID has past experience with such a program in South East Europe. With some modifications it should be possible to replicate the program in CAR. Any donor who has the motivation to carryout such a program could do so and the cost for the software and training could be included in one of the transmission system loan packages. If USAID were to replicate the similar effort based on the experience in South Eastern Europe then a budget on the order of \$1.5 million over two or three years would be indicated. If USAID only wanted to only provide technical specialist advisory support for assessing and advising the donors relative to transmission planning and constraints and coordinate with the appropriate IFIs to insure the inclusion of such programs are components of upcoming loans in this sector, then the total cost for this technical assistance is estimated to be \$95k (exclusive of the cost of software and training) and the project duration could be twelve months.

Development of a Regional Transmission Plan: In several of the interviews, the Team heard about serious transmission issues that face individual national systems and that involve the 500 kV lines and substations that make up the Central Asia Transmission Grid. While the problems are based on the need for individual national systems, they do have consequences

for the interconnected regional system. As new large hydro generation plants are constructed, their output will be delivered to the 500 kV CAR Grid. Additional generation capacity will result in existing transmission lines becoming more heavily loaded and there will be a need for additional transmission circuits. The need for new transmission lines will impact all countries that use the CAR grid. Since the new transmission lines will cross national boundaries and require connections to substations in neighboring countries, there will be a need to coordinate the planning of new lines on a regional basis.

- **Policy Reform Impetus and Leverage:** The development of a regional transmission plan would be a significant policy tool and could be used by each country in the region. Institutions and policy makers would use it as a guide for decisions that have both national and regional implications. If a regional plan were developed within a working group such as WEC, then it would provide decision makers with a guide and have the potential to avoid construction of duplicate facilities. Funding of such an effort could be coordinated under a loan from EBRD or ADB as part of the activities under the Power Trade Relations Agreement.
- **Goals, Support Roles and Cost Estimate:** USAID has past experience with the development of institutional groups from developing countries for the purpose of regional transmission planning. The most recent such experience is in Southeast Europe. The development of regional transmission plans may require a donor with past experience in such projects and necessary technical experts may not be available in every donor home country. As noted, USAID has experience with this type of activity and is in an excellent position to execute a similar program in CAR. If USAID were to replicate its similar program for regional transmission system planning then a budget on the order of \$1.5 million over two years would be required. If USAID wishes to provide technical specialist advisory support for assessing and advising the donors relative to transmission planning and constraints and the inclusion of such programs as components of upcoming loans in this sector. The total incremental cost for this technical assistance is estimated to be \$100k and the likely duration would be nine months.

Introduction of Hydro-Thermal Dispatch Software: At the ICWC – SIC, the Team saw a demonstration of irrigation water demand software. ICWC-SIC informed that the model has been disseminated to other countries and that they are training irrigation personnel in the use of the software. The availability of a water demand-forecasting tool provides an opportunity to introduce hydro-thermal dispatch software for the operation of large hydro plants such as Toktogul and Nurek.

The objective of the modeling effort would be to provide a view (vision or preview) of what a typical annual water-energy operating situation would look like. The modeling effort could address various scenarios. A basic scenario is the water availability scenario - normal, wet and dry. Other scenarios could be developed for cropping patterns, availability of natural gas, oil, coal etc. It could also be used to study the differences in terms of cost/benefit for an all irrigation operation of large hydro storage projects compared to an all power operation mode. The proposed modeling effort could involve three serial water-energy modeling steps and one parallel transmission planning effort.

The water-energy modeling effort would start with an irrigation water demand forecast. The results of the irrigation demand model would be used as input to a river simulation model. The river simulation model would establish water release schedules according to constraints imposed by civil structures such as bridges, channels, dams, reservoirs and hydropower generators. The river model would reproduce water flow schedules on an hourly/daily or weekly basis and it would identify any amount of surplus water that could be used for additional power generation purposes. It is conceivable that under specific annual conditions there would be no surplus water for power generation. The river simulation model would also provide a base energy production schedule.

The results of the river simulation modeling effort would then be used as input to a national and regional power generation-transmission simulation analysis. The power generation-transmission analysis would simulate the operation of all types of generators in the region. It would start with the basic hydro generation schedule and carry out an economic ranking analysis to establish an economic dispatch order for thermal generators.

Software such as Generation-Transmission Maximization (GTMax) or Stochastic Dual Dynamic Program (SDDD) can be used to model the operation of each country system as well as the region.

The transmission model would include a model of the 500 kV and 220 kV CAR transmission system. The transmission model would be developed as a parallel modeling effort and could be part of a regional transmission system planning effort. The results of the generation-transmission simulation analysis would provide cost of energy at specific locations on the grid in terms of location-based marginal prices (nodal price). The proposed modeling effort could be accomplished through the WEC structure, , either as part of the planning process of river basins described above or as an independent activity focused on regional power generation and transmission.

- **Policy Reform Impetus and Leverage:** The introduction of hydro-thermal dispatch software would be a major policy reform within each country and the region. Kazakhstan, which has an operating spot market, is closest to doing a hydro-thermal dispatch. If each country used a modern hydro-thermal dispatch algorithm, there should be significant financial benefits. Use of such software would foster the establishment of groups of experts and consultants within each country. The cost to provide each country with up to date hydro-thermal dispatch software could be a part of any number of pending loans to countries in the region.
- **Goals, Support Roles and Cost Estimate:** Any donor with access to software suppliers and in-country experts to provide training could undertake this activity. It is suggested that USAID could provide technical specialist advisory support for assessing and advising the donors relative to transmission planning and constraints and the inclusion of such programs as components of upcoming loans in this sector. The total cost for this incremental technical assistance task is estimated to be \$95k over a period of nine months.

Separation of the Grids: As described in the body of the report, there is a potential risk to the CAR region following the sudden separation of the CAR grid from the North Kazakhstan – Russian grid. Given the potential consequences of an unsuccessful separation of the entire CAR transmission region from the North Kazakh-Russian grid, this problem should receive some attention. As power exports grow, the reliability of the grid will become an increasingly important concern. An analysis of the problem using power system simulation software could be accomplished as part of an overall transmission system-planning task. Such an analysis would study the problem under several operational scenarios and result in a set of recommendations. The recommendations could be as basic as updated protective relay settings. If the analysis shows that the problem is more serious, then design of a region-wide power On-Line Dynamic Security Assessment system may be required.²⁰

- **Policy Reform Impetus and Leverage:** As a policy issue, this problem is probably not well known among government officials. Until there is a serious disruption of power in the region, such as a region wide blackout caused by the separation, the significance of this issue will not be recognized. The study and analysis of the problem will involve transmission system planners and analysts in each country. If the problem were studied and analyzed by each transmission company, then it may be a focal point that draws technical experts together. In this sense, it could be an institutional strengthening activity. The initiative to undertake an analysis of this problem could come from USAID or it could come from a lender such as EBRD, ADB or World Bank. Each of these lenders has access to technical experts who would appreciate the potential for this problem to reach a serious level.
- **Goals, Support Roles and Cost Estimate:** This problem may have been analyzed as part of the planning to construct the second north-south 500 kV transmission line in Kazakhstan. However, over the past several years, there have been major blackouts through out the world. When they occur in developing nations, they are treated as one-off events. However, the post fault analysis often generates major upgrades and construction of new facilities. Any of the major donor nations with in-country power system experts can undertake the analysis of the problem and USAID could provide technical specialist advisory support to assess and advise donors relative to transmission planning and constraints and the inclusion of such programs as components of upcoming loans in this sector. A budget on the order of \$50,000 over several months would be indicated. The suggested budget for this technical assistance would only be valid if the activity were included as an addition the transmission-planning task listed previously.

Reliability Status Reports: As part of an open access transmission grid, there is a need to have a metric by which reliability of the grid can be measured. The collection and tabulation of outage data for transmission lines and major substation equipment by the owner/operator is a basic activity. In many countries, outage data is presented in annual reports to regulators or government ministries and is often the basis on which decisions are made for construction of new lines and substations as well as rate increases. The establishment of reliability databases in each country could be accomplished as part of a transmission system-planning task within a greater overall scope.

²⁰ Ad Com of Power System Dynamic Performance Committee of IEEE-PES; “Causes of the 2003 Major Grid Blackout in North America and Europe, and Recommended Means to Improve System Dynamic Performance.”

- **Policy Reform Impetus and Leverage:** The availability of an annual reliability report will provide a metric by which policy makers in each country could evaluate the effectiveness of investments in the CAR transmission grid. In addition an annual reliability report would also provide a guide to areas in which transmission system improvements are required. Preparation of an annual reliability status report would probably involve national and regional institutions such as design institutes, national control dispatch centers and transmission owner/operators. Throughout the world there are agencies that prepare such reports and these reports are used by legislators, and governments to evaluate the performance of the electric power grid. At this point, the Team is not aware that any other donor is addressing this issue.
- **Goals, Support Roles and Cost Estimate:** USAID has past experience with this type of activity in its work in the Baltics, CENTEL and Southeast Europe. Any one of the donor agencies from countries where such reports are prepared could field a team of experts to assist utilities in the Central Asia Republics. . It is suggested that USAID could provide technical specialist advisory support to assess and advise donors relative to transmission planning and constraints and the inclusion of associated training programs as components of upcoming loans in this sector. An incremental budget amount for this technical assistance is estimated to be \$ 50,000 over a period of six months and would only be valid if included as an addition the transmission planning task listed previously.

Introduction of Transmission Services Pricing Methods: As CAR prepares to make the transition to a regional energy market, there is need for a uniform transmission services pricing methodology. The costs for transmission access should be uniform and transparent to all users. Adoption of a transparent pricing methodology will require the approval of all countries that propose to participate in the regional market. Approval by each country will serve as evidence that the countries intend to adopt, from the outset, transparent processes, and thus would provide reassurance to potential private investors. Although this is largely a technical assistance effort, it will tend to establish the policy from the beginning of the transition to a regional market that transparency is a fundamental principle.

- **Policy Reform Impetus and Leverage:** Introduction of standardized transmission service pricing methodologies would be a major policy change. At the regional level, UDC presently determines the cost of transmission services. In Kazakhstan, the transmission services pricing is determined by KEGOC with review and approval by AMC. In the Kyrgyz Republic the SEA provides a similar function. If a donor were to introduce a standard pricing methodology, then it would have to prove its suitability to achieve acceptance in each country and the region. Institutions that would be affected by the introduction of transmission service pricing methodologies would include the UDC in Uzbekistan, KEGOC in Kazakhstan, the National Grid Company in the Kyrgyz Republic and Barki Tojik in Tajikistan. If there were a separate entity in Uzbekistan that had responsibility for the high voltage transmission lines, then it would be involved. Leverage with other lenders or donors: Other lenders and donors besides USAID who could carry out such a program include the EU, CIDA, KFW, World Bank, EBRD, ADB etc.
- **Goals, Support Roles and Cost Estimate:** Because the methods and procedures involved with the pricing of transmission services is relatively new in electric utility

terms, development of pricing methodologies is an evolving effort.²¹ Donors could accomplish an activity involving the introduction of modern transmission services pricing methods with access to technical experts who have experience with the concepts and methods. It is recommended that USAID could provide technical specialist advisory support based on experience in existing US power markets and advise donors relative to transmission planning and the inclusion of such programs as components of upcoming loans in this sector. A suggested budget allocation for this more specialized technical assistance is estimated to be on the order of \$100,000 over a period of six months and would only be accomplished after the preceding elements were accomplished.

Do Nothing Examples: Specific examples of what entities other than USAID might address/support if USAID were not to support a specific recommendation element is provided above. In general terms, one significant impact of a USAID “do nothing” approach would be a negative impact on current and future US business interests in the region because USAID often is the primary resource for technical support in the development of transparent and well regulated markets and the rule of law and can “seed” opportunities for American business interests in the region. These cornerstone setting support works are what subsequently make it possible for significant investment in the Region by US business interest. Specific impacts anticipated for a “do nothing” approach in the energy sector are expanded below for each CAR country assessed in this report.

Kyrgyz Republic

The government has taken the necessary steps to disaggregate the formerly vertically integrated electric power sector. They have created separate organizations for generation, transmission dispatch and distribution. Although these basic steps have been taken there is much yet to do before the Kyrgyz Republic can fully participate in a regional power market. There is a serious need to provide technical support and develop a utility regulator that understands its role in a market setting and that can exercise well-founded independent judgments.

If USAID does not continue to support the development of the electric power sector, then:

- (1) Other donors may step up and take over the activities of USAID
- (2) The electric power sector may drift along on a path toward financial chaos
- (3) The problem of winter water releases for hydro generation at Toktogul and consequent down stream damage in Kazakhstan will become a greater problem in the region. Continued damage to infrastructure assets in down stream countries could become the basis for increased tension and deteriorating foreign relations between the Kyrgyz Republic and its down stream neighbors.
- (4) Possible increased activities by Russia for construction of Kambarata I
- (5) Finding a solution to the Toktogul water release problem provides a template or model for the solution of similar problems in TAJ and water releases into

²¹ CIGRE Task Force Report 38-05-07; “Methods and Tools for Costing Ancillary Services”; June 2000.

the Amu Darya River. If USAID did not continue to support the search for the Toktogul problem then it would mean that the solution to the similar problem on Amu Darya would also be delayed.

Tajikistan

Tajikistan is moving forward with a new 500 kV transmission line (Regar - Kuljent) that will provide relief from the Uzbek control of Tajik in-country power flows as well as opportunities for exports to North. Russia and Iran are funding construction of new hydro generation projects on Vaksh River. The transmission system in Tajikistan can also be used to provide a connection between Afghanistan and the CAR grid.

If USAID does not continue to support the developments in the electric power sector, then;

- (1) Other Western donors may also stop support for privatization in the electric power sector.
- (2) Iran will purchase power from Sangtuda for export via transmission connection in Turkmenistan.
- (3) Russia will move forward with Rogun HPP.
- (4) A potential export source for electric power to Afghanistan would be in question.
- (5) Progress toward privatization of the electricity sector will be slowed. Development of local distribution companies would be based on village-based activities such as those supported by the Aga Khan Foundation.
- (6) There are some potentially serious technical civil/geotech problems at existing hydro power plants on the Vaksh River, and USAID could be source of technical expertise to find solutions to these problems.

Kazakhstan

The electricity sector in Kazakhstan is developing at a regular pace. Progress is being driven by activities of out side developers such as AES and by export sales to Russia. The development of the electricity market in Kazakhstan provides a point of reference for others in the region to see.

If USAID does not continue to support the developments in the electric power sector, then;

- (1) There is a need for technical assistance to the regulator in Kazakhstan. If USAID does not provide assistance, then the impact on the present success in development of a flourishing electricity market could be compromised.
- (2) The program to build the second North-South 500 kV line, which is being funded by EBRD and others, would probably continue.

- (3) The PTRAs have tasks set aside for USAID to perform in conjunction with bulk power sales for cross border trades. If USAID dropped out and did not honor its commitments, then USAID would be viewed in a negative light.
- (4) If the expansion of the electricity market in Kazakhstan slows or stumbles, then naysayers in the region will use this as an argument against continued privatization.
- (5) The Djambul TPP near Almaty is a potential source of power for export to Afghanistan to supply winter loads. If USAID did not continue to support activities in Kazakhstan, then it could impact on negotiations for power from Djambul.

Uzbekistan

Uzbekistan lags behind the other CAR countries in a number of areas. These limitations and donor government and IFI related controls on funding due to various concerns about human rights and repayment have an impact on the size and scope of programs in Uzbekistan.

If USAID does not continue to support the developments in the electric power sector, then;

- (1) The Uzbekistan could turn to the Russians for assistance. This would be a natural path since there are legacy connections between Uzbekistan's design institutes and Russian experts. Such developments could occur with possible assistance from the EBRD. Following the trip to the CAR a meeting was held with EBRD London. In that session a brief insight into EBRD activities to assist the Russians with the development of an electric market in Russia was provided. Since the CAR transmission system is a part of the larger Russian grid (due to the construction of the North-South 500 kV line in Kazakhstan) the countries of CAR (Uzbekistan included) will be influenced by developments in the Federal Grid of Russia (RAO UES).
- (2) Uzbekistan could also be influenced by the fact that Kazakhstan has made advances in the development of a national energy market. As described in the report, there are pressures at work on the Uzbek government to privatize and follow a path similar to that of the Kazakhstan. If there is adequate technical expertise within the surviving design institutes, then it could be possible that Uzbekistan could institute a privatization program of their own design.
 - a. The team also realized that within the Uzbek government there was a hesitance to proceed with an aggressive privatization program because they view the process that occurred in Kazakhstan as an initial failure. They are reluctant to proceed along the path that Kazakhstan initially followed. What is needed is an alternate way for Uzbekistan leading to eventual privatization. This report proposes to let Kazakhstan lead the way and for the Kyrgyz Republic and Tajikistan, by being more cooperative and aggressive with privatization show positive economic

results and for this to be the way Uzbekistan is motivated to make changes.

- b. There are problems with the power sector in Uzbekistan and these cannot be ignored. For example we were advised that there are power shortages in the country and there are often inadequate reserves. From time to time they must resort to load shedding. In addition the Talimarjan plants (800 and 2400 MW) is not yet in commercial operation and the team was told that there are major technical problems with the basic design. On the other hand the Uzbeks have recently completed a power plant rehab project under an agreement with Siemens. There is a significant amount of installed generating capacity in the country that is inoperative because the units require rehabilitation and upgrading. If there is no assistance from the international community, and Uzbekistan cannot successfully address the problem (current donor and most IFI funding is restricted) then the reliability of supply could deteriorate even further.
- (3) There may be some in the Uzbek government who realize that the unused capacity could be a potential revenue source. As Uzbek policy makers see the revenue opportunity from the sale of Uzbek capacity into the Kazakhstan and other export markets they may advocate some progress in the Uzbek energy sector. If inoperative plants were rehabilitated then their output could be sold (especially in winter since the Uzbek plants are fueled by gas and coal) over the CAR 500 kV transmission lines or exported to Afghanistan and south with improvements in transmission noted in the report. If this potential revenue opportunity is attractive to the Uzbek government then, with international funding, they could become motivated on their own to move forward.

5.6.2 Support for Privatization of Power Sector

The Team's recommendation related to the Kyrgyz Republic is narrowly focused on the support for the concession/privatization process currently under way in that country. Transfer of the distribution companies to concessions or private parties, resulting in a reconfiguration of incentives as compared to those that now exist for current public sector operators, seems the only way to overcome the current problem of "theft" of electricity resulting in low revenues and almost non-existent investment in the electrical infrastructure. USAID should support the transition to new management in any way possible, whether by helping prepare concession documents or other assistance. Kyrgyz inefficient use of Toktogul storage is an issue in the region and improvement of that situation will enhance prospects for cooperation among the CAR countries. Assistance in the public information and outreach to parliamentarians and political leaders should also be a near term component of this privatization plan.

USAID should consider providing expertise to the Kyrgyz Government in privatization (concessionaire) process, selection qualification criteria/standards and process transparency, contractual conditions, termination clauses, etc. in the near term to ensure the privatization of

the SeverElectro is done in a fair and transparent manner and that conditions for success (contractually clear) are established.

Privatization optimally can create incentives for reductions in “un-metered energy” leakage and investment in metering and other solutions to this problem. It should be emphasized that the momentum and political will for privatization in the Kyrgyz Republic is not consistent and upcoming elections have dampened any enthusiasm that might have existed on the political side as elected officials generally do not wish to be seen supporting a potentially contentious issue just prior to an election. Regulatory authority and oversight for the privatization process has been unclear and this also has impacted the political will behind privatization. Various donor and IFI organizations have reduced their support for the energy sector in the Kyrgyz Republic. This can either be taken as a sign that such support should be reduced (going with the consensus) or that specific areas of support are targeted (e.g. independent regulatory and review board, transparency, increased participatory governance and commercial contracts) and engagement with the current (sometimes shifting) privatization authority entity would be the a more consistent approach (keeping a more regional issues focus). We are recommending the later approach be taken in the Kyrgyz Republic.

In the experience of the team, corruption (or at least some form of insider advantage taking) is not an unusual situation in many of the countries of the FSU. As a result, our recommendations related to preparing the CAR for an energy market is very critical to reducing the impact of such insider “rent seeking” behavior. The team heard various references and comments about corruption. The obvious manifestation of corruption at the distribution level can easily be seen in the amount of unmetered energy and associated consequential lost revenue in the Kyrgyz Republic. The team recommended that USAID redesign its programs to deal with this type of corruption. The recommendation is to move away from engineering assistance and address the issue from a commercial performance and market education approach. The team did encounter programs dealing with corruption while in CAR (UNDP – Kazakhstan through their governance activities) among others.

As the development of regional electricity trading moves forward there will be inevitable pressures on participants (traders) to take advantage of free market activities. One can easily envision an ENRON type of phantom trading exploitation of a CAR regional market. Unless the governments involved, take necessary steps to accurately and transparently monitor and track power sales and subsequent money transfers, there will be a very high possibility for corruption in such regional power trades. At present the majority of such trades are accomplished with bi-lateral contracts. If USAID would resume its previous assistance in subject of power trade contracts, then USAID could have a direct influence in the establishment of standard contracts with confirmation of physical power transfer and related financial/banking transaction standards. If these contract principles were established before an open market is introduced, then it would go a long way toward the success of a regional market.

- **Policy Reform Impetus and Leverage:** The introduction of privatization (concessionaire) aligns with regional policy goals for privatization and economic reforms.

Support for this has political support at the Head of Government level but not at the parliamentary level as individual parliamentarians and political leaders have not been adequately educated in the advantages of privatization. Consequently they see it as a risk to be seen as a proponent of something that their constituents do not know much about or who are suspicious of such changes in the first place. In addition concessionaire selection process standards, contract conditions are not set and concerns about insiders taking over such cash flow rich businesses are potentially justified. However, it is likely that some of the political motivation for privatization comes because of the expectation of insiders to leverage influence to gain the concession and its substantial cash flow without commitments or requirements for reinvestment, social protection, etc. having been written into the terms, conditions and guarantees to be required of the concessionaire. Should such conditionality be successfully applied to the concession terms and conditions it may greatly reduce this privatization motivation factor. This is another reason for the privatization benefits awareness program referenced in the bullet point that follows. Leverage from Democracy and Government programs should be used to make appropriate contacts and develop support program. Other lenders and donors besides USAID who could carry out such a program include the EU, CIDA, KFW, World Bank, EBRD, ADB etc.

- **Goals, Support Roles and Cost Estimate:** It is recommended that USAID only provide technical specialist advisory support (legal/contracts) for assessing and advising the Kyrgyz Government on privatization, and for the development and production of public education and awareness programs and materials and for direct meetings or training seminars for key parliamentarians on the privatization issue. The total cost for this more legal and contracts advisory support would be business process improvement and public information focused specialized technical assistance and materials production and distribution effort is estimated to be \$55 k for advisory services and \$25 k for public education (advisory assistance, mass media, flyers and brochures) and the duration would be one person month for advisory services for each support area.

5.6.3 The Kyrgyz Republic Energy Security

A significant factor in the most contentious issues arising over the past few years concerning the application of the 1998 Framework Agreement finds basis in the fact that the Kyrgyz Republic sees the operation of the Toktogul Reservoir and its hydroelectric station as a critical component of its energy security. This energy security focus is in a great part due to the fact that The Kyrgyz Republic is a net importer of fuels for its CHP stations, industrial use and for commercial consumer use for cooking and heating. As hydro electricity is available for essentially the cost of operations and maintenance alone and our interviews indicated that they are not doing more than the bare minimum maintenance this is essentially “free” energy from the Kyrgyz Republic’s perspective. . In addition, based on the results of the metering pilot project in the Kyrgyz Republic it is clear that a significant amount of load (at winter peak) is unconstrained by economics since it is unbilled. Metering and billing (including increased meter reader supervision and possibly some form of automated billing or the application of fraud/forensic audit analysis tools to customer bills could add considerable self-regulation to energy consumption in winter as well as provide much needed customer payment for energy used to cover the purchase of fossil fuel for the Kyrgyz Republic CHPs. In addition a programmatic improvement plan to improve thermal performance of these plants and their associated heat distribution network should be considered (funded by IFI,

carbon credits, purchaser of generation plants or some combination) to improve fuel utilization to directly reduce the amount of fuel used and needed to be provided/bartered/purchased based upon the charges for storage of water in winter for irrigation in the vegetation period. Note, although the current payment situation includes very significant levels of barter transactions, and such transactions should be clearly noted/handled in any automated billing and accounting system, barter transactions are not recommended in this report and should be systematically phased out over time as economic conditions permit.

Distribution System Un-metered Energy Program: USAID should redesign its pilot programs that presently deal with electricity metering.; The redesigned program should recognize that the solution to the problem of un-metered energy and illegal connections are not technical problems. The solution to the problem of un-metered energy and illegal connections lies in the commercial sector and requires approaches that are based on adoption and implementation of modern marketing and retail business principles. There is also a need for customer education programs that are focused on a change in consumer mind set. Such programs would have as an objective a change in customer thinking -- that since the power system is owned by the government (i.e. the people) then they (customers) do not need to pay for it. Due to problems described to the team related to meter reader collusion with customers any un-metered loss reduction strategy should consider other options and programs suitable to the individual CAR countries. In our experience in other countries with similar small load consumers the use of pre-paid metering has reduced unmetered losses, meter reading costs, and has let consumers better manage their consumption thereby having a positive impact on load management. In some cases (e.g. the Kyrgyz Republic) laws may have to be changed to allow the use of such equipment.

- **Policy Reform Impetus and Leverage:** The introduction of privatization (concessionaire) aligns with regional policy goals for privatization and economic reforms. Support for this has political support at the Head of Government level but not at the parliamentary level as individual parliamentarians and political leaders have not been adequately educated in the advantages of privatization. Leverage from existing pilot metering programs should be used as well as possibly making some sort of agreement with Uzbekistan. Leverage with other lenders or donors: Other lenders and donors besides USAID who could carry out such a program include the EU, CIDA, KFW, SDC, World Bank, EBRD, ADB etc.
- **Goals, Support Roles and Cost Estimate:** Because the relationship with the distribution company has been established for the metering pilot project it is reasonable to leverage this relationship to provide technical advisory support on the billing process side of the “un-metered” loss issue. It is recommended that USAID only provide technical specialist advisory support for assessing and advising the distribution company management on billing process improvements. The total cost for this more business process improvement and specialized technical assistance is estimated to be \$65 k and the duration would be three person months.

Energy Efficiency: The energy efficiency pilot studies in the Kyrgyz Republic have resulted in significant savings. It has been suggested to the Team that the program be expanded to have national coverage, wherein local banks would provide loans for the purchase and

installation of the energy efficiency equipment. The Team has had experience in Energy Efficiency related projects in Moldova and Armenia where work has ranged from pilot projects similar to those done by USAID in the Kyrgyz Republic to development of a donor financed revolving fund to assist in co-financing qualified and approved energy efficiency projects. These projects have shown a savings in energy losses equal to the initial investment in many cases in two years or less depending upon technical and environmental conditions. Even in this more advanced phase of energy efficiency, empowerment projects are funded at from zero percent (0%) beneficiary participation for government or public service entity projects to at most a fifty percent (50%) cost share participation for commercial ventures. Even for viable commercial projects with two-year return on investment economics our experience is that standard commercial bank loans and scarce government funds are not something that are likely to be sources of funding for such projects. Projects involving schools and polyclinics where beneficiaries are children and the most vulnerable segments of the population can have cross sector benefits in the health, education and social services spheres as well as provide high profile energy efficiency promotional public information and education related to the benefits of energy efficiency.

- **Policy Reform Impetus and Leverage:** The programs for development of small to medium enterprises (including IFC lending to CAR Banks for this purpose) and USAID SME programs have policy alignments with this proposed activity. In addition the development of a sustainable energy efficiency service infrastructure business environment aligns with the need to mitigate the necessary rate increase impact from aligning electricity rates with true costs of service and social safety net issues for the most vulnerable members of the population. Orientation of heating and weatherization system pilots toward such facilities as schools, polyclinics, public buildings and hospitals aligns energy rates rationalizing goals with goals in social and health sectors. Leverage from existing pilots and expansion to include other programmatic elements can leverage funds from other programs (e.g. SME development, SBA funds, Empowerment, Health and Social Vertical) Other lenders and donors besides USAID who could carry out such a program include the EU, CIDA, KFW, World Bank, EBRD, ADB etc.
- **Goals, Support Roles and Cost Estimate:** Because the relationship with local energy efficiency materials and engineering sources and Energy Service Companies (ESCOS) have already been established in pilot programs it is reasonable to leverage these relationships to provide technical advisory support on the energy efficacy process and resource development side of the issue. It is recommended that USAID consider leveraging considerable energy efficiency experience in the CAR and Caucuses region to seed and expanded energy efficiency program. The total cost for this more business development focused energy efficiency program is estimated to be some \$110 k per year first year and \$120k for each of the next two years.

5.6.4 Regulatory Agency Support

Support for the regulatory agency in Kazakhstan possibly also the regulatory agency in the Kyrgyz Republic has priority. The Anti-Monopoly Commission in Kazakhstan requested assistance for the design of a tariff policy that will result in investment by the private sector adequate to upgrade and then maintain the condition of distribution system assets on a long-term basis. Kazakhstan is the leader of reform of the electric sector in the region and it is

important to complete the process, enhancing Kazakhstan's role as the "demonstration country" displaying the benefits that accrue from reform.

The regulatory agency in the Kyrgyz Republic, the State Energy Agency, requested additional assistance from USAID. It seemed to the Team, however, that the regulator in the Kyrgyz Republic, with little apparent budgetary support from the government, has little influence as well. After departing the Kyrgyz Republic but before leaving CAR, the Team was informed that the political authorities in the Kyrgyz Republic had agreed to an Energy Ministry, and this development could give the State Energy Agency more authority. Given the magnitude of the electricity loss problem in the country, formation of a new Ministry could make a difference. The Team is not in a position to evaluate this latest development.

- **Policy Reform Impetus and Leverage:** The spokesman for the Anti-Monopoly Commission (AMC) in Kazakhstan requested consideration of support from USAID for the design of a new tariff policy, one that will result in greater private investment in distribution system infrastructure. Lack of investment is contributing to the high level of electricity losses that many of the distribution companies in Kazakhstan are experiencing. The experience of other countries may be helpful to the AMC in design of tariffs adequate to ensure private investment but balanced by the interests of consumers.
- **Goals, Support Roles and Cost Estimate:** Because the relationship with regulatory body has already been established and support requested the need should be focused on tariff policy to empower the privatization process in CAR. It is recommended that USAID leverage its existing efforts to support regulatory reform to perform this assistance. The total cost for this more privatization focused assistance is estimated to be some \$65 k over three months.

5.6.5 Afghanistan Energy Supply

Capacity and energy sources are available (or are under development) in CAR to meet the near term and developing electricity needs of Afghanistan. Transmission, however, is lacking. Two alternative routes for transmission to Kabul are assessed below.

- **Policy Reform Impetus and Leverage:** The current energy situation in Afghanistan is constrained from years of war and neglect. Current national generation capacity is under 500 MW²² and predominant source of generation is standalone diesel engine and combustion turbine driven power generation equipment more normally found in emergency power service regimes. In such applications running cost associated with diesel fuel is not an important factor in energy source selection. In addition there is some run-of-river hydroelectric generation at the Kabul load center. An equally important aspect is the fact that the country has no national transmission infrastructure.

Among the generation assets in the CAR region that could be used to supply demand in Kabul and Afghanistan is the Jambul power plant in South Kazakhstan. The Jambul plant is not being operated on a regular basis because there is lower cost generation available from AES Ekibastuz in Northern Kazakhstan and Toktogul Hydro project in the Kyrgyz Republic. The Jambul plant is a dual fueled (natural gas – fuel oil) plant with six 215 MW

²² Central Asia Regional Electricity Export Potential Study, World Bank, June 2004 chapter V.

units, or 1290 MW. Other sources of power in CAR are the Nurek Hydro plant in Tajikistan, which has surplus energy in summer, and the Toktogul Hydro project in the Kyrgyz Republic, which conceivably has power available year round. The combination of Jambul power in winter and hydro in summer would reduce the cost of electric energy in Kabul from its present high level. In addition other TPP in CAR may be rehabilitated and this could shift capacity to allow other generation assets (e.g. Uzbekistan - Talimardjan TPP and Kazakhstan - Djambul TPP) to be used in this power exchange. In order to fully assess what power plants can be used for this purpose the full transmission constraint assessment proposed in Section 5.6.1 of this report would need to be completed.

Energy from Jambul should be on the order of three to five cents per kWh and energy from Nurek and Toktogul should be in the range of one to two cents per kWh. In addition to the cost of energy at the plant substation, a charge for transmission services would be added. Presently, the cost for transmission services on the CAR grid is reported to be \$0.5 US cents per 1000 km per kWh. Current average cost of energy in Kabul is about \$.09 per kWh with diesel fueled generation component (diesel engine and gas turbine drive) at \$.13 per kWh. It is expected that the electricity tariff for Kabul would have to be at least \$.05 or \$.06 per kWh to meet fully recover the cost of service for importing energy from CAR to Kabul. Energy supplies to northern areas of Afghanistan adjacent to Tajikistan and Uzbekistan are already in place using existing feeders and the delivered price is around \$.03 per kWh.²³

Short-Term Transmission Alternatives: There is an immediate need to provide low cost electric power to the Kabul load center in Afghanistan. Existing power generation resources in Kabul consist of the run-of-river Sarobi hydro station and several combustion turbine driven generators. It is reported that the combustion turbines are fueled with imported diesel oil and are very expensive to operate. An estimate of the present cost of electricity in Kabul is on the order of 20 US cents per kWh. There is generation capacity and energy available in the CAR region that could be dispatched to Afghanistan resulting in substantial cost savings. However, there is no high voltage transmission line between the Kabul load center and the CAR grid.

There are two possible transmission paths from the CAR grid to the Kabul load center. One is a 60 km long double circuit 110 kV transmission line from Kunduz (aka Kondozi) in Afghanistan to a 220/110 kV substation in Tajikistan. The substation in Tajikistan is located near one of the following places in the Khatlon region: Dusti, Dysmts, or Panji Poyon. The second transmission option is a 71 km long double circuit 220 kV transmission line from Khulm (aka Kholm) substation in Afghanistan to the Surkhan substation in Uzbekistan. Both lines in Afghanistan are reported to be in damaged condition and will require rehabilitation.

The approximate point-to-point distance between Kabul and Kunduz is 230 km and the point-to-point distance between Kabul and Kholm is 290 km. Given the distance from Kabul and the points of connection, it appears that the connection to Tajikistan should be studied at 220 kV instead of the 110 kV line that currently exists. In this case, the

²³ "Central Asia Regional Electricity Export Potential Study", World Bank, June 2004

transmission line to Kabul from Tajikistan would start at the 220/110 kV substation in the Khatlon region of Tajikistan, adding another 60 km to this possible line equaling the distance of the line from Kholm. A quick assessment suggests that the cost of transmission from Tajikistan to Kabul and from Uzbekistan to Kabul will be much the same.

The Unified Dispatch Center (UDC) in Tashkent could carry of a preliminary evaluation of the proposed generation and transmission options. The UDC could be asked to make load flow studies of the CAR transmission grid for each of the transmission alternatives and generation scenarios. The case study list should include summer and winter peak scenarios as well as minimum load cases for summer and winter. In both cases, it most likely would be necessary to have generation on line in the Kabul load center for the purpose of reactive power supply and voltage regulation. In summer, it may be possible to use the run-of-river Sarobi hydro stations for reactive support and voltage regulation, and the combustion turbine driven generators would be required in the winter.

The load flow analysis may show that the transmission connection from Tajikistan is more desirable since the power flow from Nurek hydro plant could flow directly south to Afghanistan instead of flowing through Uzbekistan on the single circuit 500 kV Regar – Guzar line, which could experience overload and congestion. The analysis may also show that the overall reliability of the CAR grid is improved during the winter when the Jambul plant is in operation.

- **Goals, Support Roles and Cost Estimate:** Because the dialog between USAID/CAR and Kabul has been established a project coordinating activity between these two USAID Missions could be developed to fully asses generation and transmission options, plan the best path, develop the tender and manage the procurement and implementation program. This would be a multi year project with a short term (repair/upgrade existing circuits) mid term (construct new circuits) and longer term (construct new high voltage 220/500 kV lines). Since the need for a solution to this problem is urgent it is recommended that USAID fund the feasibility evaluation as a Special Appropriation. The immediate scope would be to provide technical assistance to UDC for the preparation of load flow analysis followed a preliminary engineering design and cost estimate for the indicated solution. As soon as possible the recommended solution should be used as the basis for negotiations with an engineer/constructor for construction. The total cost for this project development and management effort (funded by USAID/Kabul) is estimated to be some \$1.5m per year for five years.

5.6.6 Power Exports from CAR

Throughout the CAR region, the Team heard that there is serious interest in electric power export from the CAR. Presently there is active export from generators in CAR to North Kazakhstan and Russia. The World Bank is in the process of completing a study to develop a long-term electric energy export plan for the CAR region²⁴.

²⁴ Raghuveer Sharma; World Bank, Washington D.C.; “Regional Electrical Export Potential Study”; Draft dated Sept 2004.

Among the export possibilities being considered is export of low cost hydro energy from Nurek, Rogun and Sangtuda hydro plants in Tajikistan. The output from these plants would be especially valuable in Pakistan during peak demand periods.

Although not specifically a focus of this assessment, rehabilitation of existing fossil fueled thermal power plants (TPP) in CAR regions close to the existing transmission links to Afghanistan could also provide energy at or below costs associated at least in comparison with diesel fueled generation. Full details on economics of these options can be found in the two World Bank references cited.

Given these long-term possibilities, the feasibility of constructing a 500 kV line to Kabul, with eventual completion to Pakistan should be discussed. The assessment would be a side study to the base plan for a transmission line between the CAR system and Kabul. Such a study would consider the transmission connection as a 500 kV line but initially operated at 220 kV. The objective of the study would be to compare the first cost of a 500 kV transmission plan against the first cost of a 220 kV plan. The financial analysis should be made as a comparison of present value of each plan in terms of projected load growth rates in Kabul with projected export levels to Pakistan. If the load growth in Kabul and export to Pakistan were to occur in a few years, the cash flow analysis may favor the 500 kV option.

It was understood by the team that some CAR countries who might seem to be candidates to be net power exporters were possibly limiting consumption locally through the use of rolling blackouts and other such means to cut consumption due to possible transmission/distribution constraints, cost or quantity of fuel, or possibly to conserve TPP fuel for other purposes. To add to this list of reasons for cutting off local consumers – to export power to other countries could cause widespread discontent from the people who's power was cut off.

5.6.7 Recommendations Based Upon Russia / China Geopolitics and Investments in CAR Region

As the CAR investments by Russian and China of interest to this study are focused in the energy field, the recommendations based upon this factor will be addressed here in the energy section of the recommendations. It should be noted that it is likely that only a limited number of these investments may impact energy planning over the next five years since most of the more significant projects proposed to date are at the earliest stages of development or funding. However, it can be seen that there are clear signs that would suggest a pattern of nationalistic energy source and distribution control emerging in Russia. This is likely a factor motivating China to invest in pipelines that will bypass other fully Russian controlled supply routes. The investment in hydroelectric assets by Russia (assets show to be non-cost effective in non-export mode by recent studies) and for some (e.g. Kambarata II – run of the river) generating power primarily during the seasonal period of “oversupply”²⁵ if looked at from the local perspective, can only be assumed to have significant power export or fuels trading motivations for such “investment” decisions. On the fuels side of the picture, and from the

²⁵ “Central Asia – Regional Electricity Export Potential Study” World Bank, June 2004

strictly Russian perspective, shipping someone else's oil and gas (CAR) optimally through Russian controlled transmission systems to the biggest developing markets (e.g. India, Pakistan, China) sets up a solid dependency relationship while persevering Russia's own internal oil and gas assets (and influence) for the future.

Consequently, if donors did nothing in this sector (it is probable that IFI's might fund some as investments in any case) it is likely that major and expanded energy investment by Russian and China (generation, oil and gas fields, and energy transmission) would occur in any case but this investment will have an energy export focus that will not be likely to provide much emphasis on free markets and transparent trade (e.g. Yukos/Yuganskneftegaz/Gasprom/Baikal Investment Group version of transparency) or put much emphasis on sustainable economic growth for the CAR. The result is that it would be in the interest of other donors (i.e. USAID, EU) to focus on helping CAR countries to: 1) assist in the development of bilateral and multilateral energy contracting practices that are based on international standards; 2) strengthen any regional agency (e.g. WEC) and/or national agencies/regulators in their ability to implement a regional market so that they can properly regulate policies and practices, as well as enforce them; 3) develop tariff methodologies that are fair, cover the cost of expenses, and are implemented in a transparent fashion; 4) assist in the formulation of regulatory policies and tariffs that consider the needs of the most vulnerable members of the CAR population; 5) provide technical expertise in the analysis and design of transmission systems to support regional and specific neighboring country (i.e. Afghanistan) energy security needs (including assessing network constraints); and 6) provide assistance focused on creating a level playing field for investors (not just insider/rent seekers) in privatization of generation, distribution and transmission assets.

The assessment of Russian interests in CAR developed for this report was conducted based upon literature search, specific source research in regional energy economics and team experience in Russian and the NIS. Due to the large scale of Russian investment in CAR and its potential impact on programs under consideration by USAID it is recommended that a focused short-term assessment be conducted to better understand the strategies and plans of the Russian entities making significant investment in the water and energy nexus sectors of CAR. This assessment should include direct interviews with policy and decision makers in these government and business entities as well as with consultants already engaged in assisting these entities in developing international energy and market agreements and plans. One purpose of this proposed assessment would be to establish an ongoing communication link between USAID and these Russian government and business entities for future dialog and coordination to minimize duplication of effort and to maximize the energy sector impact of USAID's programs in CAR.

5.6.8 Support for USAID-World Bank and ADB Partnership

The Team recommends that USAID participate with the World Bank in Tajikistan, supporting their loan to upgrade distribution company services in that country. USAID assistance will be directed at policy and institutional issues. USAID background in the

Kyrgyz Republic dealing with the same issue is perfect experience for the Tajik assistance. The Swiss volunteered their willingness to work with USAID on this project.

Finally, should the PTRAs be approved, the ADB will require assistance in preparing proforma trading agreements, metering protocols, and agreements for ancillary services and the open-access energy sales system. Both ADB and EBRD have included in their budgeting an amount of \$500,000 for USAID to carry out four tasks as part of the regional power trading agreements under the PTRAs.

5.7 Water Sector Recommendations

Other options for future USAID assistance are based, for the most part, on an extension of program elements already underway. These include:

- Continue support for WUAs
- Canal Automation
- Resource Management Support Systems (River Gauging Stations and Metrology)
- Continuation and expansion of coverage of water management computer models (NOPI/DSS)
- Assistance to the Ministry of Agriculture and Water Resources (MAWR), Uzbekistan

Each of these options is discussed in general terms of the evaluation criteria noted above.

5.7.1 Programs for the Organization of WUAs

The current WUA program is scheduled to last for another five years. Together with USAID, the Team recognizes the WUA program as an essential component of irrigation rehabilitation now being emphasized in the CAR. Both structural rehabilitation and change in institutions, such as the organization of WUA's for purpose of taking responsibility for irrigation system O&M, are required if the IFIs are to avoid returning to the CAR in ten to fifteen (10-15) years for yet more rehabilitation. Based on the information assembled by the Team and as described in Section 4, the IFIs are not doing very well in the area of organizing the WUAs although, as also noted in Section 4, the program being implemented in the Kyrgyz Republic is an exception to this general condition.

The OIP program in the Kyrgyz Republic is a separately funded activity for the sole purpose of creating an organizational structure, comprised of WUAs, for operation and maintenance of infrastructure at the tertiary level of the irrigation system. As described above, that program has been successful in creating, within a relatively short time, WUAs and support institutions that cover much of the irrigated area of the country. In the view of the Team, an OIP-type program for organization of WUAs coupled with the USAID supported WUA program, emphasizing improvements in irrigation techniques and cultural practices, offers a possibility of not only advancement in the organization of self-sustaining WUAs but also significant increases in agricultural output and improvements in water use efficiencies.

One of the notable features of the OIP program is the process by which WUAs qualify to become eligible for project rehabilitation funds. That process has striking similarities to the

techniques described to the Team by a representative of the Aga Khan Foundation in Tajikistan. As a part of the process of organizing villages in Eastern Tajikistan, Aga Khan enforces a process of self-organization and planning before the NGO steps in to provide significant resources in support of priorities identified by the villagers. As with the villages, the WUA's in the OIP program pass through a number of milestones before achieving the goal of being deemed qualified for longer term support. The milestones associated with the OIP program are as follows:

1. Establishment of WUA including legal registration
2. Recruitment and training of WUA staff
3. WUA prepared O&M plan including setting of O&M fees
4. Payment of O&M fees
5. Preparation of rehabilitation plan
6. Selection of plan
7. Agreement to repay costs of rehabilitation under OIP terms

Experience in the Kyrgyz Republic shows that all milestones can be accomplished by a WUA within a year.

Integration of the current USAID WUA program focused on demonstration of improved irrigation and associated cultural practices would provide an input that is currently missing from the OIP program. The USAID program includes the Kyrgyz Republic as one of its target countries and, with the approval of the DWR, the executing agency for OIP, the AID funded activity may be readily incorporated as a training component in the milestone process. More importantly, the Team recommends that USAID work toward the replication a OIP/USAID program for organization and effective operation of WUAs throughout the CAR region. Alternatives for accomplishing this are as follows:

1. Working with the IFIs, modification of current irrigation rehabilitation projects to incorporate the OIP model of organization of WUAs together with USAID WUA demonstration activities;
2. Working with the IFIs, preparation of new projects for Uzbekistan, Tajikistan and Kazakhstan that incorporate the OIP WUA institutional model together with USAID technical knowledge base related to irrigation and cultural practices; and
3. Design and funding of an OIP-type organizational model/USAID demonstration and training activity for a priority country or selected command areas within targeted countries.

Under each of these alternatives, the principal activity of the current USAID WUA program would remain much the same—testing and demonstration of improved irrigation and related cultural practices. However, rather than organizing farmer groups as a demonstration activity which is a component of the current USAID WUA project, the USAID program would be anchored to country sponsored OIP-type programs intended to put in place viable WUAs and thereby capture the benefits—improved water use efficiencies, greater agriculture output and transfer of O&M responsibilities to farmers—that accrue from the program. With the success of the OIP model in the Kyrgyz Republic and the success of the USAID WUA program, the

Team recommends that USAID continue a modified program of technical assistance in the design and implementation of WUA programs in Uzbekistan, Tajikistan and Kazakhstan.

5.7.2 Canal Automation.

The Canal Automation option has been picked up by SDC and thus it becomes questionable as an activity for USAID to pursue. The Swiss are already undertaking pilot studies of canal automation. Moreover, as a continuing project activity, it does not appear to have significant policy or institutional impacts.

5.7.3 Resource Management Support Systems (River Gauging and Meteorological Stations)

Much the same is true for the program to install river gauging stations and metrological monitoring to improve management of the Syr Darya River. The Swiss also have a program in this area. The policy and institutional impacts of the gauging station intervention are murky. Certainly, it is true that management of the water resource will improve as better and more timely data on flows are obtained. However, the fact that the Swiss considered pulling out is a negative. Little analysis also seems to be available confirming the success of past USAID improvements. Experience and past history of USAID with the intervention is a positive feature. This is an important resource management and planning area for all basin stakeholders but, in view of the problems noted by the Team, described above, the USAID program should be carefully assessed to determine if management of the river system has or is likely to improve in the present situation.

5.7.4 Continuation of the NOPI and DSS Programs

The final two programs are NOPI and DSS. Both have the potential for significant impacts on institutions. It is also anticipated that NOPI will be applied in the early stages of WEC to assist with the negotiations that will take place between working groups from each of the concerned countries. The model can help in analyzing “what if” situations assuming alternative operating regimes for Toktogul, thus providing a means of determining the amount of year-to-year carry-over storage in the reservoir associated with varying degrees of risk of irrigation shortfalls. The outcome of the analysis will ideally be a four-country agreement to support a designated level of carry-over storage in the Toktugul reservoir to reduce the risk of crop failures due to water shortages. Compensation for maintaining the agreed storage would need to be a part of the bargain.

Should the WEC process move on to a second stage involving the preparation of river basin plans, preparation of complete hydraulic simulation models for both the Syr Darya and Amu Darya rivers will likely be part of the river basin planning process. The models, incorporating flows within the main stem rivers as well as storage and flows within the tributaries will enable precise determinations of risk and related storage requirements in both mainstream and tributary reservoirs to offset water supply shortages in drought periods. The tradeoff of carry-over storage in Toktogul with reductions in hydroelectric power production can be assessed with appropriate least-cost generation software once the constraints on water use for irrigation, based on varying levels of risk of irrigation water shortfalls, is known.

At this point in the preparation for negotiations under the framework of WEC, it is not known whether negotiations to arrive at a four-party agreement for use of the Syr Darya river (followed by the Amu Darya river) will require and benefit from the completion of complete river basin plans. As described above, the Team speculated that negotiations would eventually need to move on to a second stage involving preparation of long term development plans for the basins. Should that be necessary, the NOPI model and the planned preparation of a simulation model for operation of the Chardara reservoir together with the database and analysis already completed for DSS position USAID in a position to efficiently complete a model for the entire Syr Darya river basin.

The Team recommends that USAID assist with the four-party deliberations scheduled for the initial stage of WEC discussions involving an analysis of the trade-offs between carry-over storage in Toktogul with losses in hydroelectric power generation. The NOPI model will facilitate these studies. Should a second stage of deliberations be required, the Team recommends that USAID remain involved in the process, especially for the preparation of the complete simulation models for the rivers including the inclusion of GTMAX or other appropriate software integrating hydroelectric power with fossil-power sources of generation in the region (see also Section 5.6.1 above “Introduction of Hydro-Thermal Dispatch Software”). The latter model, including both hydropower, other sources of generation and transmission facilities connecting load centers, will be a valuable tool for not only examining trade-offs between alternative water uses but also in determining least cost generation operation and expansion programs.

5.7.5 Assistance to the Ministry of Agriculture and Water Resources (MAWR), Uzbekistan

The cost-sharing investigations being conducted with MAWR have strong policy implications, and this intervention is highly valued in terms of that criterion. The assistance is scheduled to be completed in August 2005, at which point, if MAWR requests further assistance, USAID can evaluate if the activity is accomplishing its aims of developing an acceptable policy for cost-sharing of expenditures for irrigation O&M.

5.8 Institutional Coordination Recommendation

5.8.1 USAID Leadership

The World Bank Country Manager, Uzbekistan, suggested greater consultation between donor agencies for the purpose of developing common assistance strategies for the CAR. Currently, the donors meet periodically to inform and discuss their respective programs of assistance. However, there is little attempt to develop common strategies. The development of common approaches by donors could have the following positive impacts:

- (1) From the perspective of the recipient government, the initiative has the potential of mobilizing greater resources to address an agreed assistance activity; and
- (2) From the perspective of the donors, the impacts of the investments will be enhanced due to coordinated and focused development approaches.

USAID as a long-time donor in the water and energy sectors in the CAR is in position to take on the role of organizing common strategies for those two sectors. The proposal above in Section 5.7.1 to integrate the USAID WUA program with IFI funded on-farm irrigation institution support projects similar to OIP in the Kyrgyz Republic, and thereby promote the effective expansion of WUAs in Uzbekistan and elsewhere, is one such opportunity. The result of this initiative for USAID can be a significant leveraging of funds from the IFIs and other donor agencies in accordance with USAID approaches to development.

5.8.2 Program Assessments

The Team did not find evidence that USAID's project assessment processes included formal analysis of pilot and demonstration projects economic consequences. When asked why this was the case, USAID representatives suggested that it would be too costly and, secondarily, that everyone knows what is required based on world practice. Indeed, the Team did not find anything significantly wrong with the content of the USAID program of pilot and demonstration projects. However, lacking data on benefits/measurable results and costs, the assessment of whether or not the aims of the on-going program elements are being achieved, as required by the SOW, was more difficult to make and constituted a less rigorous assessment process than would have been possible had cost and benefit information for ongoing and past projects been available.

6. REFERENCES

Reports and Documents Reviewed

1. USAID Transboundary Water and Related Energy Cooperation for the Aral Sea Basin Region of Central Asia Project, Phase I: Assessment of Issues and Proposals for Phase II, Contract No. LAG I-00-99-00019, Order No: 809, May 5, 2002
2. USAID Central Asia Natural Resources Management Program, Transboundary Water and Energy Project, Proposals for Improved Water and Energy Management in the Syr Darya River Basin, Contract No. LAG I-00-99-00019, Order No: 809, January 29, 2003
3. USAID Central Asia Natural Resources Management Program, Transboundary Water and Energy Project, An Initial Assessment of Kambarata 1 and 2 Hydropower Projects, Contract No. LAG I-00-99-00019, Order No: 809, November 10, 2003
4. A. Nazarov, Task 11: Flow Control Systems for the Syr Darya and Amu Darya Basins, NRMP & SIWP USAID-funded projects Water Activities (2000-2004), November 19, 2004
5. USAID, Central Asia Natural Resources Management Program, Transboundary Water and Energy Project, Electricity Loss Reduction Demonstration Projects, Initial Performance Monitoring Results, Contract No. LAG I-00-99-00019, Order No: 809, June 1, 2004
6. USAID, Electricity Loss Reduction in Kyrgyzstan, Roundtable on Report “Electricity Loss Reduction Models – Initial Performance Monitoring Results for Severelectro and Oshelectro pilot areas, Bishkek, the Kyrgyz Republic, September 13-14, 2004
7. “Conceptual Description of the Costs to Kyrgyzstan of the Multiple Purpose Operation of the Toktugul Reservoir”, USAID, TWEP, 2003.
8. J. Michael Biddison, “Afghanistan and Central Asia: Next Steps for Energy and Water Cooperation,” USAID, 25 June 2004.
9. “Naryn Cascade Operational Instrument (NOPI). Overview of Proposed Principles”, USAID, TWEP, March 2, 2004
10. Water Resource Development in Northern Afghanistan and its Implications for Amu Darya Basin, Executive Summary, November 2004
11. World Bank Conception on the Creation of an International Water and Energy Consortium of the Central Asia Cooperation Organization member countries, July 2004
12. Draft Agreement on Establishment of International Water-Energy Consortium by Republic of Kazakhstan, Kyrgyz Republic, Republic of Tajikistan and Republic of Uzbekistan, World Bank, November 2004
13. “A Revised Approach to World Bank and Development Partners’ Involvement in the area of Water-Energy Cooperation in Central Asia”, World Bank, 2004
14. Review of World Bank paper “A Revised Approach to World Bank and Development Partners’ Involvement in the area of Water-Energy Cooperation in Central Asia”, USAID, October 12, 2004

15. Outline of a Regulatory Framework to the 1998 Agreement on Multiple Purpose Use of the Syr Darya Water Resource, TWEP, April, 2004
16. Water Energy Nexus in Central Asia, Improving Regional Cooperation in the Syr Darya Basin, World Bank, January 2004
17. International Consortium for Cooperation on the Nile (ICCON), Nile Basin Initiative, Strategic Action Program Overview, prepared by Nile Basin Initiative Secretariat in cooperation with the World Bank, May 2001
18. Central Asia, Regional Electricity Export Potential Study, World Bank, June 2004
19. Asad Alsm, Arup Banerji, "Uzbekistan and Kazakhstan: A Tale of Two Transition Paths", World Bank, Europe and Central Asia Region, Poverty Reduction and Economic Management Sector Unit, 2000
20. The Helsinki Rules on the Uses of the Waters of International Rivers, adopted by the International Law Association at the fifty-second conference, held at Helsinki in August 1966. Report of the Committee on the Uses of the Waters of International Rivers (London, International Law Association, 1967)
21. UN/ECE Protocol on Water and Health to the 1992 Convention on the Protection and Use of Transboundary Watercourses and International Lakes, 24 March 1999
22. Convention on the Law of the Non-Navigational Uses of International Watercourses, 1997
23. "Nura Ishim River Basin Management Project", Final report, Volume 1, Executive Summary, Jacobs Gibb, Committee for Water Resources (CWR) in association with Halcrow group LTD. Kazgiprovodkhoz, January 2004
24. Aaron T. Wolf, Criteria for equitable allocations: The heart of international water conflict, Natural Resources Forum, Vol. 23 #1, February 1999. pp. 3-30.
25. Michelle N. Grajek, An Assessment for USAID/CAR on the Transboundary Water and Energy Nexus in Central Asia
26. Afghanistan Regional Trade Options for Meeting Electricity Needs. Strategic Perspectives And The Way Forward, Power Point presentation, September 2003
27. United States Energy Association (USEA), Energy Industry Partnership Program, Kazakhstan Program Overview
28. Regional Energy Regulatory Program for Central/Eastern Europe & Eurasia Energy Regulators Regional Association (ERRA), National Association of Regulatory Utility Commissioners (NARUC), Coop. Agreement EE-N-00-99-00001-00, October 2004
29. DFID Tariff Policy And Utility Reform Project Kyrgyz Republic, Discussion Note 50, Commercial Performance Of Electricity Distribution Companies For 2003, March 2004
30. DFID Tariff Policy and Utility Reform Project Kyrgyz Republic, Discussion Note 33, Household Energy Survey 2002, June 2003
31. Bulletins of Kazakhstan Electricity Association (KEA) for 2003-4
32. "Strategy and Project Activities to Support Improved Regional Water Management in Central Asia", UNDP, July 2004
33. Central Asia: Water and Conflict, International Crisis Group (ICG), 2002
34. V. Alavian, J. Keller, F. Guymont "Assessment of Water Management in Central Asia and Recommendations for Future USAID/CAR Technical Assistance", USAID/CAR, December 1999
35. "The Report and Recommendation of the President to the Board of Directors on Proposed Loans to the Republic of Tajikistan and to the Republic of Uzbekistan for

-
- the Regional Power Transmission Modernization Project”, RRP TAJ/UZB 35096, Asian Development Bank, November 2002
36. “Draft Sector Note on Energy”, Central Asia, Designing a Program for Effective Management of Energy and Water Resources, For Discussion: Energy Sector Session, ADB, Regional Preparatory Meeting, 27-28 September 2003, Tashkent, Uzbekistan
 37. “The Study on water and Energy nexus in Central Asia”, Contract No. ADM/01-576, RSC No. C10732, prepared by NRMP, August 31, 2002
 38. “Swiss Water Strategy for Central Asia 2002-2006 – Strengthening Regional Water Management Capacities”, SECO, 2002
 39. Protocol of the Session of Intragovernmental Working Group of Water and Energy Organizations to Regulate Cascade Regimes for Syr Darya Reservoirs, September 16, 2004
 40. Gregory Gleason, “Financing Russia’s Central Asian expansion”, Central Asia-Caucasus Analyst, 3 November 2004
 41. Information from forthcoming paper by Sam Johnson, Private Consultant and Joop Stoutjesdijk, Irrigation Engineer, World Bank “WUA Development and Strengthening in the Kyrgyz Republic”

Websites reviewed and referenced:

1. <http://www.nrmp.uz>
2. <http://www.crisisweb.org/>
3. <http://www.worldbank.org>
4. <http://www.ifc.org>
5. <http://www.ida.org>
6. <http://preview.deza.ch>
7. http://www.usaid.gov/locations/europe_eurasia/car/
8. <http://www.gazprom.com>
9. <http://www.kea.kz/eng/index.php>
10. <http://www.kazakhstaninvestment.com>
11. <http://www.eurasianet.org/>
12. <http://www.wuasp.uz>
13. <http://www.cia.gov>

APPENDIX A – USAID SCOPE OF WORK (SOW)

A.1 TITLE

An Assessment for USAID/CAR on the Transboundary Water and Energy Nexus in Central Asia

A.2 STATEMENT OF WORK

AN ASSESSMENT FOR USAID/CAR ON THE TRANSBOUNDARY WATER AND ENERGY NEXUS IN CENTRAL ASIA

STATEMENT OF WORK FOR A TASK ORDER FOR THE ENERGY II IQC

Introduction

USAID/CAR has been providing assistance to the water and energy sectors of Central Asia for over ten years. Activities have been implemented on both the national and the regional level and have consisted of a wide variety of projects. Some of the most important of these activities have been aimed at the difficult issues associated with transboundary water and the related hydropower resources that all the CAR nations use and manage. USAID/CAR is seen as a leader in this area due to its long involvement, the high quality of the assistance it continues to provide to regional organizations and Ministries, and the level of cooperation with other donors.

USAID staff from the office of Energy and Water (EW) have determined that it would be prudent at this time to conduct an assessment of their further work related to the transboundary water and energy sector in CAR. Several factors have contributed to the decision to perform such an assessment. They are:

- The current USAID funded activity, Transboundary Water and Energy Program (TWEP) is in the final 12 months. The USAID/CAR Mission, along with USAID/W, is considering the possibility of meaningful follow-on activities and is seeking recommendations as to which directions and avenues of approach (if any) would be the most effective for further assistance programs.
- As the Mission will be developing a new Strategic Plan in the next year, the assessment will be a valuable contribution to this effort and will be used to help develop goals and strategies for the Mission, as part of the new Strategic Plan.
- Other donors, especially the World Bank and the Asian Development Bank, have stepped up their interest and intentions to support improvements in the transboundary water and energy sector of CAR. The European Union is launching a new program in the region as well, and other donors have suggested they may be interested in expanding work in this arena. In light of these interventions, USAID needs to re-examine its role in the sector vis-à-vis the planned actions of other entities.

- Likewise, the regional counterpart institutions managing CAR water and energy have undergone several significant organizational and political changes in the past five years. An assessment will assist USAID in determining which of these institutions offers the best advantage as a strategic partner for any future USAID/CAR programs.
- To date, most USAID assistance in this sector has been focused mainly on the Syr Darya river basin, as it provides the primary source of water for generating electricity. However, with recent developments in Afghanistan, as well as Tajikistan, there are added opportunities and needs for providing transboundary assistance programs directed at the Amu Darya river basin as well.
- Due to budget constraints in the foreseeable future, USAID/CAR is in the process of adjusting programs accordingly, and Strategic Objective 1.6 and the Energy and Water office are no exception. An assessment of what would be the most effective programs, if any, in the transboundary water and energy areas, within foreseeable budget limitations, is needed.
- Staff from USAID's Europe and Eurasia Bureau, as well as those from the State Department, realizing the importance of the sectors to the economy and stability of the region, has requested the assessment as a means of determining the most effective role for future US assistance.

The assessment will result in a report consisting of three parts:

- An overall assessment of the transboundary water and energy situation of CAR countries including policies, practices, regional institutional capabilities, trends, and planned directions.
- An examination of the programs of: a) USAID activities; b) other bilateral donors, and c) International Finance Institutions (IFIs) activities related to the sector; and assessment of how future USAID assistance may be implemented in cooperation with these programs given our resource constraints.
- Recommendations to the Mission on opportunities (if any) for a package of water and energy assistance activities, that may or may not include current activities, which leverage other donor resources, and better enable the countries of Central Asia to achieve water and energy rationality and sustainability.

A contractor under the Energy II IQC will implement the assessment, along with USAID/W and Mission staff. The contractor will work closely with USAID staff in producing an integrated report that meets the needs of the Mission, USAID/Washington and the US State Department.

It is important to note that the assessment is not an evaluation of the current implementer's performance in conducting TWEP activities. This is a forward looking exercise to identify future USAID policy and technical support in the transboundary water and energy sectors. Although not full participants in the assessment, staff from TWEP will be available for discussions and will provide relevant documents and other information. Also, although this activity will not focus on purely national-level issues, the assessment should determine the key linkages between domestic water and energy development and the progress towards improved regional water and energy management.

II. Background

The waters of the Syr Darya and Amu Darya River Basins in Central Asia are critical to both the upstream states of Kyrgyzstan and Tajikistan and the downstream countries of Kazakhstan, Uzbekistan, and Turkmenistan. Since the breakup of the Soviet Union, the operation of these river systems for providing irrigation water as well as generating electricity has moved increasingly towards a “power generation” mode as opposed to an irrigation priority mode. Barter arrangements continue as a means to swap electricity supplies from the upstream states in the summer for gas and coal imports from the downstream states in the winter. But valuation of exchanges and failure of downstream states to supply agreed amounts has led to disagreements and excessive winter releases by upstream states to meet winter electricity needs.

With the substantial hydro and thermal energy resources of the region, there is every reason to seek more efficient and complementary systems of production and utilization. There is already a well-developed high-voltage electricity transmission system in the region and a regional center in Tashkent that has historically served in a coordinating role. In 1999, USAID helped to develop an agreement among the four countries on synchronous operation of the grid and further development of an integrated electricity market. Since then, Kazakhstan in particular has moved to develop a very competitive, wholesale power market and is experiencing rapid growth in electricity demand. Energy reforms in the other countries are not as advanced but are critical to creating the conditions for expanded trade and regional market development. Kazakhstan is synchronously interconnected with Russia and trade with Russia, including transit of power from Kyrgyzstan and Tajikistan, is increasing. Plans for a second North-South High-Voltage Transmission line in Kazakhstan are now in the early implementation stage. The ADB and EBRD are working to finance the modernization of the transmission interconnection between Uzbekistan and Tajikistan and USAID may help with the contractual aspects of electricity trade. The potential development of hydropower in Tajikistan is being studied by the ADB and the Russians may have recently agreed to help in financing hydro capacity in Tajikistan.

Substantial financing is needed for the development of the energy and water infrastructure in the region. In addition to external markets, the proper policy, legal and regulatory systems are needed to mobilize such funding and promote public-private partnerships. The development of a proposed Water and Energy Consortium can be a vehicle for developing this framework and establishing a coordinated approach to donor assistance and investment.

At the May, 2004, the Heads of State meeting of the Central Asian Cooperation Organization (CACO), Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan asked the World Bank to take a lead role in helping them form a Water-Energy Consortium. The idea of a Water and Energy Consortium to resolve conflicts is one familiar to USAID and was foreseen in the 1998 Water and Energy Framework Agreement on use of Syr Darya basin waters that USAID played a key role in brokering. However, it appears that there are different views from the CAR governments as to what role the consortium will play. Kyrgyzstan and Tajikistan see it as a means of attracting investment into their infrastructures, Kazakhstan as a regional management authority, and Uzbekistan and Turkmenistan seem not to support the concept at

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all. The World Bank has asked USAID to participate in this process and provide its extensive experience and expert technical resources. An element of this assessment will be to evaluate the feasibility of USAID cooperating with the World Bank on creating an effective and sustainable Consortium.

In order to come to a better understanding of the principal and relevant issues related to the assessment, several documents are listed below. Websites are also listed where information and reports can be found.

1. Phase I: Assessment of Issues and Proposals for Phase II. This is a USAID funded report on the main issues for further transboundary water and energy work in CAR. Prepared by PA Consulting in March of 2002.
2. An Initial Assessment of Kambarata 1 and 2 Hydropower Projects. A TWEP report which examines issues associated with these two facilities in Kyrgyzstan. November, 2003.
3. Proposals for Improved Water and Energy Management in the Syr Darya River Basin. This TWEP report describes some of the problems and possible remedial measures needed to improve the situation on Syr Darya. December, 2003.
4. Outline of a Regulatory Framework to the 1998 Agreement on Multiple Purpose Use of the Syr Darya Water Resource. This TWEP report includes what is needed to strengthen the USAID brokered Agreement on the water and energy exchanges for the Syr Darya. April, 2004
5. Transboundary Water Cooperation between Afghanistan and Central Asian States on the Amu Darya River Basin. This is a UNDP report which includes a description of the Amu Darya water resources as it relates to CAR and recommendations for possible activities. 2003.
6. Water Energy Nexus in Central Asia-Improving Regional Cooperation in the Syr Darya Basin. This World Bank report is a good analysis of the water and energy situation in the Syr Darya with recommendations for disconnecting the energy trading now in place. It is presently being revised. January, 2004.
7. Electricity Loss Demonstration Projects-Initial Performance Monitoring Results. This report describes the serious problems of the Kyrgyzstan power sector and what is needed to improve the situation. July, 2004.
8. Conceptual Description of the Costs to Kyrgyzstan of the Multiple Purpose Operation of the Toktugul Reservoir- A USAID TWEP report. 2003.
9. Afghanistan Regional Trade Options for Meeting Electricity Needs-Strategic Perspectives and the Way Forward. A World Bank Presentation. 2004.
10. Central Asia Cooperation Organization Proposed Creation of a Water-Energy Consortium—Comments and Suggestions by the World Bank, April, 2004.
11. www.adb.org. & www.worldbank.org-- The Asian Development Bank and the World Bank are very active in the energy and water sectors for Central Asia. Their websites has several documents that have descriptions, and analysis of the sectors and what kind of projects they are doing.
12. www.nrmp.uz-- This is the site of the USAID's Natural Resources Management Program in Central Asia.

All the background documents will be available upon request.

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III. Activity Description

The goal of this assessment is to take a snapshot of the current situation and identify critical development issues that remain to be addressed and describe a possible USAID role. The assessment will be directed at the most important elements of the transboundary water and related energy issues in the Central Asian Republics. The assessment will be limited to the two main transboundary river basins (Amu Darya and Syr Darya) which feed into the Aral Sea and their associated hydropower facilities. Salient trends affecting the future of the sector also need to be identified. This includes both positive and negative aspects (in terms of improved regional cooperation) of recent policy decisions and actions effecting energy trading, regional agreements, irrigation water availability, and institutional developments. Other donor activities will need to be examined and their future plans described.

Key Questions for the Assessment:

1. Are the main principles and directions in the 1998 Framework Agreement still valid?
2. What have been the main barriers to implementing the Framework Agreement and what are the prospects for successfully removing these barriers?
3. What is the potential to expand regional energy trade and create an integrated regional energy market?
4. What are the priorities for expanded IFI funding and public-private partnerships in water/energy sector if a coordinated regional program can be developed?
5. Are the four countries (Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan) ready to commit the necessary people and resources to the Water and Energy Consortium and work to develop agreements in key areas of implementation? If so, how can USAID activities facilitate these agreements? Also, how does the planned Consortium relate to the other regional organizations of the Interstate Commission on Water Coordination (ICWC) and the International Fund for the Aral Sea (IFAS)?
6. How does the World Bank intend to coordinate this initiative and support for the Consortium and what is the nature and magnitude of the potential roles to be played by other donors?
7. What potential is there for Russia and other neighboring countries to play in this process as major market for power and financier of energy projects? What is the potential for this initiative to support the reconstruction and development of Afghanistan? In this regard, there will need to be consultations with the USAID Mission in Kabul.
8. What lessons can be learned from other regional energy market and river basin cooperation efforts and are they relevant to the Central Asia region?
9. What are the assumed or estimated benefits (and costs) of such regional cooperation?
10. What are the various interests that will work for and against progress? (This includes issues on how CAR nations are implementing strategies and policies in order to meet their national interests and how this will impact regional cooperation; e.g. Uzbekistan's development of reservoir structures to become more independent of upstream releases of dam facilities).

11. What are the practices, policies, goals, and capabilities of existing regional institutions in the development and implementation of improved regional cooperation on shared water and related energy resources?
12. How effective have previous USAID activities been in fostering regional cooperation or improving regional water and energy management practices?
13. What are the priorities for USAID involvement and what results may be possible over the next 3-5 years at funding levels of \$1 million per year, and at a level of \$3-5 million per year?

The Deliverable

The deliverable will be an assessment report that will include the three sections described below.

1. An examination of the transboundary water and energy sector in CAR. The assessment team will travel to each of the CAR nations (with the exception of Turkmenistan), in order to meet with key counterparts, other stakeholders to gather information relevant to the assessment and come to a better understanding of the sector and answer the questions listed above. Team members will meet with key policymakers, water and energy specialists, representatives of regional and donor organizations, and others as needed in order to answer the key questions listed above.
2. An examination of the programs of donors and IFIs. For this component, the contractor team will meet with representatives of donors and IFIs who have had, or are currently implementing relevant programs in the region. The team will meet with staff of the World Bank, Asian Development Bank, European Union, and any other organizations with a significant program in the sector. Likewise, representatives from private sector, the appropriate Research Institutes, and other government agencies need to be interviewed. Extensive discussions with USAID/CAR contractors who are working in the sector should also take place. The team will assess the aims of on-going programs, evaluate their successes, and indicate how future USAID activities can be implemented to increase mutual effectiveness. It is important to note however that the Mission is looking for activities that will both show results on their own, and where possible, add value to or leverage funds for the activities of other donors and/or IFIs to achieve the desired results.
3. Recommendations to the Mission. The report will include well-crafted and specific recommendations on possible opportunities (if any) for future USAID assistance to the sector. Recommendations need to fall within the limits of anticipated funding, strategic objectives, and management constraints on the staff of the USAID office of Energy and Water. Information related to these factors will be provided to the assessment team upon its arrival.

As the Mission has funded several demonstration projects, recommendations should focus on either policy reform and/or institutional capacity building. Also, as there have been many detailed studies of both the national and shared water and energy sectors in CAR by many organizations, recommendations which call for more studies of this kind should be

avoided, except where it can be clearly shown that targeted analyses will produce tangible progress on new or existing initiatives.

Recommendations should further describe:

- the nature of any recommended activity, including possible constraints to the interventions recommended
- the political likelihood of any recommended policy changes occurring, including the policy drivers which, in the contractors' opinion, will result in the incentives being created or enhanced for ensuring these changes will occur
- anticipated goals and results (including timeframe)
- cooperating local counterpart organizations and/or Ministries
- possible cooperation opportunities with other donors and IFIs

The report will be delivered to USAID/CAR in both hard copy (3) form, and electronically. It will include an Executive Summary of no more than 3 pages. Both entry and exit briefings will be given to the Mission. Five days after a contract is signed, the contractor will submit a detailed work plan to the CTO.

The Assessment Team

The assessment team will consist of two senior individuals with specific policy and energy and water sector management expertise, preferably in Central Asia. This should include knowledge on the region's shared river systems and the facilities therein, regional management institutions, USAID's assistance program experience in the sector, and the major issues which are barriers to improved shared water and energy management. A local specialist will also need to be included on the team.

Staff from the USAID/CAR Mission and USAID/W will serve as resources to the assessment team. The Director of the Office of Energy and Water, or her designated substitute, will serve as the Mission's contact point for this assessment activity.

Timeline

The anticipated length of time for the assessment is approximately four months, September through December of 2004. This includes both preparation time before travel to the region and time afterwards to finalize and submit report. Assessment team members will spend at least six weeks in the region. Both entry and exit briefings will be held with Mission staff.

- September: Desk work and consultations with donor agencies in the US.
- October/November: Field visits and preparation of draft assessment report.
- November/December: Review of Draft assessment report and discussions in Washington;
- December: Preparation of Final Report and Final report submitted no later than Dec. 31, 2004

APPENDIX B – SUGGESTIONS FOR USAID ASSISTANCE

Note: Number in parentheses indicates the number of interviewees making the suggestion

- Assist with negotiations on Revised 1998 Agreement/New Water Accord (6)
- Help with functioning of WEC (5)
- Assist with River Basin Planning and Modeling (8)
- Assist with regional regulatory agency/power grid code and power pool/Ancillary Services (10)
- Assist with Bishkek distribution system changes/metering (5)
- Provide transmission planning/training (3)
- Assist with electric tariff policy in Kazakhstan (2)
- Help create water observation system (2)
- Assist with state water resource organization / institutional strengthening (1)
- Assist with policy/institutional work related to World Bank loan to improve electrical distribution in Tajikistan (2)
- Assist with agreement for Kambarata (1)
- Assist with Chu/Talas river basin studies (2)
- Help upgrade water measurement equipment (1)
- Help develop small hydros (1)
- Provide technical assistance for turbine/generator rehabilitation at Toktogul (1)
- Assist Kazakhstan in preparation for Kyoto agreement (1)
- Provide support for KEA (1)
- Assist with regional conference on electric sector reform in Kazakhstan (1)
- Co-fund energy efficiency study with UNDP (1)
- Assist with water code Kyrgyzstan (1)
- Monitor crops for satellites (1)
- Provide hydro posts (2)
- Support feasibility study directed at decreasing electric usage in winter (1)
- Support PTRAs (1)
- Provide automation for canal controls (1)
- Provide communication equipment (1)
- Support Pamir type public/private development in Kyrgyzstan/Afghanistan (1)
- Assist with N/S line in Tajikistan (1)
- Define power export market (1)
- Assist in coordination between donors/development of common strategies (1)

APPENDIX C - CAR MEETING SCHEDULE

KAZAKHSTAN

ALMATY

October 31

18:00 Eurasian Economic Community, Vyacheslav Borisovsky (Representative for Energy Sector)

November 1

10:00 AES, Dale Perry (Vice President)

11:00 USAID, Margaret Harritt, Ken McNamara, Sergei Elkin, Nina Kavetskaya

14:30 KEGOC, Yesbergen Abitayev (Vice President), Utegulov, Sergei Katyshev (Donor Project Coordinator)

17:00 EBRD, Jannat Salimova (Associate Banker, Power and energy Utilities)

November 2

9:15 SIC ICWC, Nariman Kipshakbayev (Director, Professor)

11:00 WB Regional Mission, Simon Kenny (Regional Program Coordinator)

12:30 USAID/Almaty

15:00 UNDP, Gordon Johnson, Zhanara Sagimbaeva

16:00 KOREM, Suinshilik Tiessov (President), Erikh Ulrikh (Vice President)

ASTANA

November 3

16:00 Antimonopoly Agency – Marat Zandarbekov (Head of Regulation, Energy of Natural Monopoly)

November 4

10:00 Water Committee, Amirkhan Kenshimov (Deputy Chairman)

15:00 Ministry of Foreign Affairs, Samat Ordabayev (Deputy Chairman, Committee on CIS)

19:00 Kenjemurat Dukenbaev, Advisor to Prime Minister

November 5

9:30 World Bank, Loup Brefort (Country Manager)

16:00 World Bank PIU – Kudaibergen Askarov (Technical Consultant, PIU)

17:00 ADB, Kazuhiko Higuchi (Country Director for KZ)

19:00 Water Committee, Amirkhan Kenshimov (Deputy Chairman)

BISHKEK, KYRGYZSTAN**November 8**

15:00 Kyrgyz Prime Minister's Office, Mambetov (Vice Prime Minister in charge of CAR relations)

November 9

9:00 ADB, Ashraf Malik (Country Director), Shami Puri (TA Director)

12:00 USAID, Clifford Brown, Country Representative in KG

13:30 PA Consulting, Bishkek office – Kanat Botbaev, Olga Terentieva

16:00 State Agency, Salaydin Avazov (Director)

November 10

9:00 EBRD, Daniel Berg and Aijan Sadyrova

11:00 PA Consulting, Martin Roth

14:00 SECO (Swiss Cooperation Office), Urs Herren, Bakyt Makhmutov

15:30 Water Department, Kydykbek Beishikeev (First Deputy General Director)

November 11

9:00 UNDP Community Based Water Management Project, Zharas Takenov (Program Officer, Environment)

11:00 EU TACIS Andrey Demidenko (Deputy Team Leader, Chu-Talas Project Manager)

13:00 DFID, Peter Graham

15:00 Electric Power Stations, Sagynbek Dodoev (General Director), Alexei Zyryanov (Deputy – O&M), Nytbidin Nazimidinov (Head of External Marketing and Energy Expert Department)

November 12

9:00 National Grid Company, Ilias Davydov (First Deputy General Director), Kubanychbek Ismailov (PIU Manager, Head of External Affairs)

11:00 Severelectro, Nurdin Sultamyratov (Commercial Director)

14:00 World Bank, Chris Lovelace (Country Manager), Natalia Charkova (Operations Officer)

16:00 National Grid Company, Alex Borodin Chief Dispatcher

17:30 Jamila Amadeo, USAID

18:30 Stuart Gunn, Water Resources Specialist, TACIS (former NRMP consultant)

TASHKENT, UZBEKISTAN

November 15

- 9:00 Alexander Kalashnikov, USAID/Tashkent
- 10:00 BVO Syrdarya. Makhmud Khamidov (Head), Konstantin Rakitin (Deputy Head)
- 11:00 BVO Syrdarya: Visit Upper Chirchik Barrage (SCADA System replicated by PA at the Pakhtaabad Canal and Kungahiyar Barrage in the Fergana Valley)
- 14:00 Uzhydromet, Evgeny Saveliev (Water Task Leader, NRMP)
- 15:00 Uzhydromet. Meeting Victor Chub (Head, Minister), Zokhidjon Nazirov (Deputy Director of SANAGMI)

November 16

- 9:00 SIC ICWC, Prof. Victor Dukhovny (Director), Pulatkhon Umarov (Deputy Director)
- 13:30 UDC Energia. Sergey Lyskov (Chief Dispatcher), Alexander Pridatkin (Head)
- 15:00 Ministry of Foreign Affairs. Ilkhom Nematov (First Secretary)
- 16:30 Winrock, John Baxter, COP, WUASP and Kai Wegerich (Counterpart – Consultant, Water User Associations)

November 17

- 9:00 Swiss Cooperation Development Agency, Johan Gely (Regional Water Program Manager), Murat Mirzaev (Deputy Head)
- 12:00 UNDP, Ajiniyaz Reimov
- 15:00 ADB. Sean O’Sullivan (Resident Representative), Rustam Abdukayumov (Portfolio Management Officer)

November 18

Urgench (Mandrugina, Rudberg)

- 9:00 BVO Amudarya Office, Yuldash Khudaibergenov, Chief
- 10:30 BVO Amudarya, site visits

Donalek

- 10:00 EBRD, Dilshod Akhudhanov, Nadira Mansurova
- 14:00 UDC Energia. Sergey Lyskov (Chief Dispatcher), Alexander Pridatkin (Head)

November 19

- 9:00 World Bank. Martin Raiser, Resident Representative
- 11:00 SJSK Uzbekenergo, Shukhart Pulatov
- 14:00 PA Consulting. Robert Cardinalli (FDCOP, NRMP), Azim Nazarov (WM TL); Ulugbek Islamov (WUAs DTL)
- 17:00 USAID/Tashkent, Jim Bonner (UCO Representative), Evelyn Putnam (Environment, Science and Technology Officer, US Embassy)

DUSHANBE, TAJIKISTAN**November 22**

- 9:00 USAID/Tajikistan, Peter Argo, Ashley Moretz, Konstantin Kevorkov,
- 10:00 Winrock, Bill Bell (Head of office)
- 11:15 Ministry of Energy, Jurabek Nurmahmatov (Minister)
- 13:30 Swiss Cooperation Office, Bahtiyor Faiziev (National Program Officer for Infrastructure)
- 15:00 OSCE, Saulus Smalys (Environmental Officer)
- 17:30 UNDP, Igor Bosc (Deputy Resident Representative)

November 23

- 10:00 World Bank, Bobojon Yatimov (Rural Development Officer)
- 15:00 Ministry of Land Reclamation and Water Resources, Abdukohir Nazirov (Minister)

November 24

- 13:00 Aga Khan Foundation, Kishwar Abdulahishev
- 16:00 ADB, Kazulo Motomura (Country Director)
- 17:15 USAID, J. Chamberlen, M. Harritt, P. Jerzek, B. Primm,

November 25

- 9:00 Barki Tojik, Niezov
- 11:00 Ministry of Foreign Affairs, Aslov
- 12:30 Aga Khan Foundation

APPENDIX D - MEETING ATTENDEES

Almaty, Kazakhstan Official Meetings

1. Dale W. Perry, Vice President, AES Corporation, Country Manager Kazakhstan
2. Nariman Kipshakbayev, Director/Professor, Interstate Coordination Water Commission (ICWC), Scientific Information Center (SIC), Kazakh Branch
3. Esbergen A. Abitayev, Vice President, Kazakhstan Electricity Grid Operating Company (KEGOC) and PhD Nurshan I. Utegulov, Chief of Development Dept. KEGOC
4. Jannat Satimova-Tekay, Associate Banker, Power and Energy Utilities, EBRD
5. Simon Kenny, Regional Program Coordinator, The World Bank, Central Asia Regional Office
6. Gordon Johnson, Deputy Resident Representative, Aida Karazhanova, PhD, Senior Programme Assistant, Environmental Management and Sustainable Development Unit, and Zhanar Saginbayeva, Chief of Good Governance UNDP
7. Ulrikh Erikh, Vice President, Kazakhstan Operator of Electricity Market (KOREM)

Astana, Kazakhstan Official Meetings

1. Marat Zhangarbekov, Head Management of Anti-Monopoly Commission (AMC)
2. Amirkhan K. Kenshimov, Deputy Chairman, Committee on Water Resources, Ministry of Agriculture
3. Semat Orda Baev, Ministry of Foreign Affairs
4. Loup J. Brefort, Country Manager, The World Bank, County Office in Kazakhstan
5. Kazuhiko Higuchi, Country Director for Kazakhstan, Asian Development Bank (ADB)
6. Askarov Kudaibergen, Technical Consultant, Project Implementation Unit, Syr Darya Control and Northern Aral Sea Phase I Project

Kyrgyzstan Official Meetings

1. Mr. Manbetov, Vice Prime Minister in Charge of CAR Relations
2. Ashraf Malick, Country Director ADB and Shaminder Puri, TA Director
3. Cliff Brown, USAID, Country Representative
4. P.A. Consultants, NRMP & TWEP
5. Avazov Salaydin, Director, State Energy Agency
6. Dr. Andriy Demydenko, Deputy Team Leader (Chu Talis Intergrated River Basin Study), TACIS
7. Daniel Berg, Head of Office, EBRD
8. Urs Herren, Country Director, Swiss Cooperation Office
9. Kydykbok Beishekeev, First Deputy General Director, Water Economy Department
10. Zharas Takenov, Senior Program Officer/Environment, UNDP
11. Peter Graham, Project Manager, International Department of Development (DFID)
12. Sagynbek Z. Dordoev, Director General, Electric Power Plants
13. Ilias Davydov, First Deputy General Director, National Grid, Second meeting with Borodin Viktorovich, Chief Central Operations
14. Nurdin Sultamuratov, Commercial Director, Sever Electro
15. Chris Lovelace, Senior Manager and Natalia Charkova, Operations Officer, World Bank
16. Bakyt Makhmutov, National Program Officer, Swiss Cooperative Office

Tashkent Official Meetings

1. Makhmud Khamidov, Head, BVO Syr Darya
2. Victor Chub, Head Minister, Uzhydromet,
3. Prof. Victor Dukhovny, Director, SIC ICWC
4. Yuri Liskov, Chief Dispatcher, UCC Energia
5. Illkhon Nematov, Ministry of Foreign Affairs
6. John Baxter, Winrock/Kai Wegerich Counterpoint
7. Murat Mirzaev, Deputy Head, Johan Gely, Regional Water Program Manager, Swiss Cooperation Development Agency
8. Ajiniyaz Reimov, Programme Analyst, UNDP, Tashkent
9. Sean O'Sullivan, Country Director, ADB
10. Y. H. Hudaiberganov, Chief of Union, Amu Darya BVO
11. National Dispatch Center, Tashkent
12. Martin Raiser, Country Manager, World Bank
13. PA Consultants (NRMP and TWEP)
14. Jim Bonnor, Country Representative, and Evelyn Putnam, USAID

Tajikistan Official Meetings

1. Barry Prism and Peter Jezek, USAID Afghanistan
2. William Bell, Winrock
3. J. N. Nurmahmatov, Minister, The Ministry of Energy, Tajikistan
4. Saulius Smalys, Environmental Officer, OSCE
5. Igor Bosc, Deputy Resident Representative, UNDP
6. Swiss Corporation, Tajikistan
7. World Bank, Tajikistan
8. A. A. Nazirov, Minister, Ministry of Improvement and Water Economy, Tajikistan
9. Kishnar Abdulalishoev, Manager of Policy and Evaluation, Agha Khan Foundation
10. Kazuko Motomura, Country Director, ADB
11. A. N. Niezov, Chairman, Barki Tajik
12. Sirodjiddin Aslov, First Deputy Minister, Foreign Affairs
13. Resident Project Manager, Pamir Energy Company

APPENDIX E - ANSWERS TO SOW 13 QUESTIONS

Question 1. Are the main principles and directions in the Framework Agreement still valid?

The Framework Agreement calls for annual negotiations to make decisions on water releases. This is agreeable to Uzbekistan who can determine water releases each year on the basis of flow conditions early in the vegetative period, regardless of whether they actually need releases of water from Toktogul storage to meet irrigation needs later in season. In the last two years, water availability downstream of Toktogul, from tributaries to Syr Darya, groundwater and other sources, together with normal summer releases from Toktogul have been adequate for irrigation needs. Consequently, Uzbekistan has not attended the annual negotiations. Uzbekistan has saved on the payment that would likely be due to Kyrgyzstan if a long term agreement had been in place. When the drought year arrives, Uzbekistan will return to the negotiating table, and together with Kazakhstan -- which is in an even more precarious position as the most downstream country -- releases from storage will be negotiated.

This arrangement is unsatisfactory from the Kyrgyz point of view with their unvarying need for fuel to meet winter heating requirements. Thus, they are interested in a long-term commitment from downstream countries in the form of fuel or monetary allocation that will help them meet their needs every year -- not just in the winters following vegetative periods when irrigation releases from Toktogul are required. The failure of their receiving an annual fuel/monetary value in any year results in Kyrgyzstan having to generate additional electricity in winter to meet their heating needs. This, in turn, increases the probability that water in storage will be inadequate to fully satisfy irrigation needs of the downstream countries in the growing season should a drought year occur.

To summarize, the 1998 Framework Agreement, with its annual requirement for negotiations, appears to the Uzbeks to be in their interest. This condition may continue until a drought period shows otherwise. On the other hand, the 1998 Agreement definitely appears to the Kyrgyz not to be in their best interest. Since, as the country in control of the Toktogul Reservoir, Kyrgyzstan needs have to be met, the 1998 Agreement is ultimately flawed without a long-term arrangement that ensures Kyrgyzstan compensation for its water services. The 1998 Agreement could be amended to include long term payment provisions; however, the Kyrgyz have prepared the draft of an agreement, based on other international arrangements that deal with the same issues. They apparently are prepared to use that draft as the basis for negotiations intended to resolve the water allocation problem.

The Kazakhs, as the tail country on the river, realize how vulnerable they are, and they are trying to broker a deal. The Kazakhs are both willing to take into account the 1998 Agreement as a basis for starting negotiations, and they also willing to participate with the Kyrgyz and Tajiks in drafting the new agreement taken from international experience. Tajikistan is both a middle-reach country on the Syr Darya and an upper-reach country on the Amu Darya. They are especially interested in outcomes that will favor their negotiating position Amu Darya..

Question 2. What have been the main barriers to implementing the Framework Agreement and what are the prospects for successfully removing these barriers?

The interests of the countries on the Syr Darya vary as described in Question 1, and based on interviews with officials in the concerned countries, it is apparent that viewpoints in the CAR are quite entrenched.

Thus, prospects for a renegotiated agreement -- whether based on the 1998 Agreement or a new agreement -- would appear to be limited. This condition may change in response to World Bank facilitated negotiations which are expected conducted within the WEC/CACO framework .

Question 3. What is the potential to expand regional energy trade and create an integrated regional energy market?

Export Potential

The potential for regional trade in regards to electricity sales is significant. There are bi-lateral contracts among the various countries of the region as well as contracts for sales to Russia.. There is also significant hydropower capacity that will be coming on-line when the Rogun and Sangtuda hydro plants in Tajikistan are constructed. There is furthermore significant fossil-fueled generation in Uzbekistan (approx 3,800 MW in 2002) that could be brought back into service and exported.

Creation of Regional Market

The creation of a regional energy market is probably some years off, but there are trends and forces in motion that are likely to move the process forward. It is appearing that there may be a two-step process currently at work. Step 1 of this process would be the creation of privatized national energy sectors with possible associated markets, and Step 2 would be the formation of a type of a “balancing market “²⁶ being created for the region. The Kazakhs are in the lead with the KOREM market. The World Bank is actively advocating an electricity export program, and it will be previewing its Regional Energy Export Potential study in the region. Developments in Russia as they relate to energy markets will also have an influence on the development of a regional electricity market in CAR.

There are a variety of opinions within the region about the need for and the possibility of a regional electricity market. Mostly, people have an expectation that a market will come. Many in the region are watching developments in Kazakhstan. If the Kazakh electricity market is successful, then it will provide an incentive and possibly become a model to others. The Kyrgyz and Tajiks would like to do more in the area of electricity trading.

Transmission Congestion

Problems have occurred that have resulted in transmission congestion on the 500 kV and 220 kV lines in the Fergana Valley. These problems primarily impact the Tajiks and the Kyrgyz, however, they remain a barrier to energy exports. In the case of the Tajiks, the congestion has significant costs in the form of transmission service charges that the Tajiks must pay to the Uzbeks. If new transmission lines can be built to provide additional transmission capacity in this area, then several benefits will be realized. (1) the Uzbeks will be able to by pass the Uzbek transmission and deliver energy and power from the hydro generators in south Tajikistan directly to load centers in the north of Tajikistan, (2) Tajikistan will be better able to export its hydro generation to the north, and (3) congestion in Fergana valley will be reduced.

²⁶ Spot or “balancing markets” are used by the system operator to ensure that supply and demand remain in balance at all times)

Question 4. What are the priorities for expanded IFI funding and public-private partnerships in water/energy sector if a coordinated regional program can be developed?

The CAR countries, working together, will be faced with resolving two general issues: (1) how best to develop their limited water and energy resources; and (2) how to utilize those resources most efficiently once developed. The distribution of energy resources is not equal throughout the region; Uzbekistan, Kazakhstan and Turkmenistan have oil, natural gas and coal, while Tajikistan and Kyrgyzstan have significant hydro-electric energy and then some coal. USAID and the other donor agencies are largely working in the latter area with their irrigation rehabilitation projects which are intended to allocate water more efficiently. The same is true for the WUA program where farmers are improving and maintaining their tertiary irrigation works, applying water to crops more effectively, etc. Other assistance activities in the water sector such as NOPI and DDS are similarly intended to improve the efficiency of use of the water resource. The model of reform and privatization of the electricity sector is intended to deliver electricity to CAR consumers at the lowest possible cost while also being self-sustaining. The IFIs and bilateral donors should continue -- and even try to improve -- their level of support to the delivery of these types of activities.

With the onset of cooperation, the CAR countries will soon need to focus on the question of how best to maximize the benefits that accrue to each of them as they work together to develop their water and energy resources. AEAI has prepared suggestions in Section 5.0 about how the donors might help CAR under the framework of WEC. From a donor's standpoint, with a cooperative and likely more dynamic CAR, emphasis should be given to looking for ways to tie the more troubled part of the wider region, Afghanistan, into a more dynamic CAR.. Suggestions regarding that subject are given in the main report.

Question 5. Are the four countries (Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan) ready to commit the necessary people and resources to the Water and Energy Consortium and work to develop agreements in key areas of implementation? If so, how can USAID activities facilitate these agreements? Also, how does the planned Consortium relate to the other regional organizations of the Interstate Commission on Water Coordination (ICWC) and the International Fund for the Aral Sea (IFAS)?

The four countries appear committed to WEC at least to the extent of entering into negotiations over the use of the Syr Darya River. The Vice Prime Minister of Kyrgyzstan was the only person interviewed who voiced reservations about WEC. However, given that the concept of WEC has been approved at the highest level of governments within CAR countries, Kyrgyzstan will not want to be seen as the only intransigent country in the region. It is the judgment of the Team that the organizational details of WEC will also be agreed to by all parties. Kazakhstan's ability and willingness to contribute extra funds, as described in the main report, along with World Bank and other IFI loan and credit support will likely guarantee that the financial resources will be available to enable the WEC processes to proceed as projected. Each party -- including Uzbekistan -- will provide personnel sufficiently senior to engage in serious discussions.

USAID can facilitate an agreement in a variety of ways. First, communicate to the World Bank that USAID would like to collaborate in any way possible, under World Bank leadership, to the success of WEC in trying to solve the conflicts over water use in the CAR. The requests from the World Bank country representatives for USAID assistance related to WEC implies to the Team that there continues to be a question whether or not USAID will assist in the WEC processes. As elaborated in the main report, USAID has a presence in the water and energy sectors of CAR as well as technical experience in modeling

and other areas that will be very beneficial to the negotiating process. The Team conjectures that USAID is interested in an outcome of negotiations that not only fosters cooperation of the CAR countries but also begins to tie Afghanistan's fate to the more positive prospects of the CAR.

The Team interacted with the Scientific Information Center (SIC) of ICWC and BVO Syr Darya and BVO Amu Darya. Except for a meeting with the single representative of SIC in Kazakhstan, all meetings were in Uzbekistan. The major operating arms of ICWC are in Uzbekistan -- or only in one country in the Region -- and they are generally not perceived by the other countries as regional organizations. The Kyrgyz Vice Prime Minister suggested to the Team that the ICWC does not solve anything. The Head of BVO Syr Darya indicated that, failing to get guidance from ICWC, he often has to regulate water use "at my discretion". A reformed ICWC, with representation in their operating organizations from all countries, will be one of the outcomes of successful negotiations conducted under the WEC framework.

Except for the new Chairman of IFAS in Tajikistan, the AEAI Team did not hear anything positive about the development efforts under IFAS. Most of the donors who addressed this specific question said they did not intend to participate in funding of IFAS second phase projects. The Chairman, of IFAS -- who is also First Deputy Minister of Foreign Affairs in Tajikistan -- said that IFAS may be helpful to WEC by being able to organize five party discussions. The new Chairman's personal efforts to resolve the water use conflicts as well as his continuing interest in contributing to the WEC process appears to be a positive sign.

Question 6. How does the World Bank intend to coordinate this initiative and support for the Consortium and what is the nature and magnitude of the potential roles to be played by other donors?

The World Bank has been asked by Kazakhstan to prepare a draft of the operating details of WEC. The process of approving that draft will likely include a review by Kazakhstan followed by review, adjustment as necessary, and an approval of the organizational details by all the participating countries. This is a country-driven process. It did not become clear through limited interviews about the extent of the progress that has been made to date.

Early indications are that the countries will concentrate, in the early stages of operation, on reviewing the experience of other countries in dealing with transboundary water and energy issues. The World Bank has offered to facilitate workshops involving CAR representatives and specialists from other countries and have the latter persons recount their experience in the design and management of regional water management organizations. USAID can assist with this effort by offering to sponsor US specialists in river basin water management and development as participants in the workshops. The initial activities are intended to bring the parties together and to enable the next stage of WEC to proceed in a spirit of cooperation, appreciation of benefits that would accrue from cooperation, and knowledge of mechanisms for implementing a change in policies. In this changed atmosphere, it would be hoped that significant progress would be made in negotiations between the countries to resolve regional water allocation problems.

As had been proposed as a part of the ADB working group process, it is also envisioned that USAID could assist in the negotiations under the WEC framework by applying its NOPI model to assist in the answering of technical questions associated with the effect of different operating rules for Toktogul. It is anticipated that out of the process will come agreed rules for operation of Toktogul, including an incentive structure for each country that will be consistent with those rules. Currently, it is the latter aspect that is much of the problem. Kyrgyzstan has no incentive to return to the irrigation-first mode of operation, and Uzbekistan

sees no reason to compensate Kyrgyzstan for years in which it does not need the water. Many other factors play a role such as a country's current economic condition and whether or not a water shortage is imminent or recent. As suggested in the main report, it may be difficult for the countries to focus on the more long-term benefits of cooperation as compared to current conditions and perceived short-term advantages.

Question 7. What potential is there for Russia and another neighboring countries to play [a role] in this process as major market for power and financier of energy projects? What is the potential for this initiative to support the reconstruction and development of Afghanistan? In this regard, there will need to be consultations with the USAID Mission in Kabul.

Export to Russia and Neighboring Countries

Basic infrastructure for energy trade is in place in the form of the 500 kV CAR grid and the UDC control center in Tashkent. Electricity energy exports to Russia have become possible since the north-south 500 kV transmission line in Kazakhstan went into service about two and a half years ago. There are existing bi-lateral agreements for electric energy sales to Russia from generators in the CAR region. Among the suppliers are AES Ekibastuz in Kazakhstan, Toktogul and Nurek Cascade generators in Kyrgyzstan, and Nurek in Tajikistan.

Several CAR officials expressed a desire to export electricity to other countries in the non-CAR region, including: Pakistan, Iran, and China. Exports to Afghanistan are a special case since there are existing transmission lines from Uzbekistan and Tajikistan into northern Afghanistan. There is a also transmission line under construction between Iran and the Mary substation in Turkmenistan. Significant hydropower capacity will be coming on-line when Rogun and Sangtuda hydro plants in Tajikistan are constructed. Iran has recently signed an MOU with Tajikistan for energy from Sangtuda hydro plant. In addition, there is significant potentially available fossil-fueled generation in Uzbekistan (approx 3,800 MW in 2002) that could be brought back into service and exported. Finally, in Kyrgyzstan, there are attempts to construct the Kambarata project. Even though it is not a project that is favored by IFIs, the Russians have indicated that they are interested in completing its construction. Thus, if Kambarata is eventually brought on-line, then it would be able to deliver its output to the 500 kV CAR grid for export.

The World Bank is actively advocating an electricity export program, and it will be previewing its Regional Energy Export Potential study in the region. The proposed transmission plan includes a new transmission line that would allow electric energy exports from generators in CAR to markets in Iran, Afghanistan, Pakistan, as well as China.

There are developments in Russia to create an energy market, and this will also have an influence on the development of a regional electricity market in CAR. It was reported that about eight months ago, Russia set up an electric trading market. It was also reported that the Russians are trying to set up an international trading system. In two or three years, it is also estimated that private industries in Russia will be able to purchase power from sources outside of Russia such as Kyrgyzstan and Tajikistan. When that time comes, the EBRD estimates that the Russians and the CAR countries will assess the feasibility of a regional electricity market.

Another potential factor driving electricity exports to Russia is the fact that Russia has signed the Kyoto Accords, and in so doing, it will require Russia to close down some of its polluting coal-fired power plants. Shutting down these coal plants could create a capacity and energy deficit. One possibility for the Russians would be for it to make up the deficit by importing hydro energy from electricity generators in Central Asia.

In meetings with Barki Tojik and the Minister of Energy, it became apparent that there is a desire to export electrical energy from the Nurek hydro plant to Afghanistan. The missing link in this possible plan would be the construction of a transmission line from Tajikistan to Kabul. A description of the options for a transmission connection to Afghanistan are discussed in greater detail in the main section of this report. In addition, Barki Tojik management has also offered to provide technical assistance to the Afghanistan government for the reconstruction of existing transmission lines in Afghanistan damaged during the hostilities.

Since Russia has interests in exporting oil and gas from CAR, this interest would mean that the use of oil and gas for CAR electricity generation would reduce the availability of the commodity for export by the Russian oil and gas companies, who have invested in oil and gas concessions in CAR for the purpose of exporting it for a high profit (and not to have it used for internal consumption at controlled prices). Thus, oil and gas exports are likely to be more of a driver for Russian-financed development of hydro power in CAR than for electricity export to Russia or elsewhere. This is because electricity exports requires upgrades to transmission infrastructure that will take years to build and the new CPC pipeline is already in service.

Question 8. What lessons can be learned from other regional market[s] and river basin cooperation efforts, and are they relevant to the Central Asia region?

River Basin Cooperation

Some of the lessons that emerge from a review of other cooperation efforts are as follows:

1. Cooperation between countries that share a water resource is difficult to achieve;
2. Yet each of the countries is better off if they cooperate in the use of the shared resource, certainly in the long term when the comparison of cooperation is made to a condition of protracted and costly conflicts including the costs of lost opportunities;
3. Cooperation emerges, if it is to emerge at all, out of a process driven by the involved countries themselves, not by external efforts that develop policies or programs for the parties without their full participation;
4. This process can take a long time and it may result in a series of short term agreements that prove inadequate but are part of a process necessary for the countries to arrive at a final more lasting agreement that clearly benefits all parties;
5. The process will be facilitated by the sustained assistance of a neutral third party, such as the World Bank.

The country-driven process in CAR with World Bank assistance follows these lessons. It is not clear, at this point, how long the process will take until a lasting agreement is achieved

Regional Electricity Markets

The development of true regional electricity markets is a new phenomenon in terms of electric utility history. There are various examples of such markets in the industrial economies of Europe, North and South America, as well as in some Pacific Rim countries. The challenge for the CAR countries is to select the market structure from among the various market structures that best fits their situation. This process will probably be a long and tortuous one as a result of the number of players, competing needs, and issues.

Possible options to the region include²⁷:

- Balancing a market such as NORDPOL. -- This market is a sophisticated market that provides maximum flexibility among the participants and also allows for contract trading.
- Location Based Marginal Pricing --. The best example of a market that uses this methodology is the New York ISO and PX. This is also known as a Nodal Pricing methodology, and it is found in several South American markets.
- Day-Ahead Spot Markets -- This option may be the most common market structure in operation. An excellent example is the PJM market in the US.
- Hybrid Market Models -- In this class are various forms of markets that incorporate nodal pricing methods, along with bi-lateral contracts, spot markets, and ancillary service markets.

USAID has been involved in previous attempts to create regional electricity markets in several regions of the world including; South Eastern Europe, Baltics, Central Europe. Based on its previous experience, it should be possible to identify an approach that will work in CAR.

Question 9. What are the assumed or estimated benefits (and costs) of such regional cooperation?

Water Benefits

The benefits from regional cooperation must be compared to the alternative of a continuation into the future regional non-cooperation. This second option implies continued conflicts over water allocations, periodic scarcities of water for irrigation with attendant reductions in agricultural output (especially in the lower reaches of the rivers), higher potentials for domestic unrest from shortages of both water and energy, and a continuing failure to address the region's environmental problems. Specific benefits from cooperation in allocating the waters of Syr Darya include a maximization of benefits from the Toktogul project where both the World Bank economic analysis and the analysis utilizing the NOPI model demonstrated that higher benefits can be achieved from a mode of operation that gives greater weight to irrigation. With cooperation, CAR countries will be in a better position to attract international capital investment for the large hydro projects that will -- in the long run -- support the region's growth through low cost power sources. Cooperation also implies the eventual

²⁷ Wollenberg, B.F.; Christie, R.D; & Wangenstein I; "Transmission Management in the Deregulated Environment"; Special Issue on the Technology of Power System Competition; Proceedings of the IEEE; Feb. 2000; Vol. 88; no. 2;

integration of the countries' economic systems on the basis of comparative advantage, both within the more narrowly defined CAR region as well as the wider region, including Afghanistan.

Energy Benefits

There are several regional benefits to regional cooperation in energy. They include:

- Reserve sharing (hydro and thermal) – the establishment of a regional grid (instead of four or five separate national grids) will allow for sharing of reserves from generators within the region. This is already happening as a result of the large hydro plants in Kyrgyzstan and Tajikistan that are being used to provide spinning reserve. The clear benefit is in the form of reduced expenditures for reserve generating capacity by each country. A typical number for reserve capacity on the order of ten to fifteen percent on annual peak demand. For the Central Asian Region, with an annual peak demand of 25,000 MW, the required reserve generating capacity would be on the order of 2,500 MW to 3,750 MW and would represent an investment in the range of two to four billion Dollars.
- Market-based optimized use of energy resources -- with an energy market to set prices, there will be benefits because the market will select the lowest cost generators in each country on a day-to-day basis. This should result in uniform electricity prices through out the region.
- Attraction of new capital for the construction of new power generation facilities -- a regional energy market sends positive price signals to power plant developers. As the system grows and loads increase, developers will see increased opportunities for earning revenues and return on investment from investments in new capacity. If there is a regional market with a regional planning process, it should result in the recognition among the participants that added transmission lines and facilities are required. Thus, new facilities would be constructed according to need and regional grid reliability would be assured.
- Sovereignty Issues -- with a regional grid, each country will have to give up some of its control over system operations within their respective countries in exchange for overall benefits. Decisions such as plant and transmission line maintenance scheduling may be determined on the basis of the region as compared to national interest.
- Obligations -- each country will assume obligations to construct new facilities and carry out maintenance according to dictates from a regional grid management authority. This will mean that portions of each country's national budget will be dictated from outside the country.

Question 10. What are the various interests that will work for and against progress? (This includes issues on how CAR nations are implementing strategies and policies in order to meet their national interests and how this will impact regional cooperation; e.g. Uzbekistan's development of reservoir structures to become more independent of upstream releases of dam facilities).

Numerous barriers stand in the way of cooperation. Some of these were noted in Section 3.0 of the main report. Some barriers include the power of sovereignty as a governing instinct, differences in economic conditions and strategies, the technical nature of the water resource itself, and the time it

often takes for governments to make decisions. Conflicting views exist within the various government agencies, and an example of how difficult it may be to reach a solution through compromise was presented to AEAI when it was told by the Director of the Scientific Information Center, ICWC, Uzbekistan that from the start he was against the 1998 Agreement asserting that you “cannot mix water and power”. On the other hand, the Head BVO Syr Darya worries about the security of irrigation supplies and the subsequent potential for unrest in Fergana Valley, and thus, he calls for a settlement based on compromise.

Uzbekistan’s development of downstream reservoirs is an outcome of the present stalemate, and it is also an example of some of the costs that are involved in non-cooperation. Having developed these reservoirs puts Uzbekistan in a position less likely to compromise, especially since significant sacrifice has been made to construct the reservoirs and they have little value as intermediate reservoirs for improving irrigation deliveries.

Question 11. What are the practices, policies, goals and capabilities of existing regional institutions in the development and implementation of improved regional cooperation on shared water and related energy resources?

The capabilities of IFAS and ICWC were previously discussed in the comments in Question 5. The Scientific Information Center, ICWC -- which seems to exist in a significant way only in Tashkent -- appears to have well qualified personnel working under the direction of an experienced Director. The staff demonstrated to AEAI a large- scale although very brief and limited to staff of the BVOs in Uzbekistan, meetings with BVO Syr Darya and BVO Amu Darya suggested that staff of those organizations, responsible for water allocation between outlets and O&M of main and secondary canals are well-qualified and competent optimizing model which had been designed and developed within the Center. Optimizing models tend to bury choices within a mass of usually static equations, and for that reason, they are less effective in clarifying issues than simulation models. Nevertheless, SIC’s achievement appears impressive.

Question 12. How effective have previous USAID activities been in fostering regional cooperation or improving regional water and energy management practices?

In accordance with the SOW, Section 4.0 of the main report reviews the on-going programs of USAID. These programs include those that generally started after 2000, and they tend to focus on demonstration and pilot projects. Previous USAID programs tended to focus on policy and institutional change, the most significant accomplishments being the 1998 Framework Agreement in the water sector and the Parallel Operating Agreement in the power sector. While the 1998 Framework Agreement has had mixed success, , it has accrued for USAID substantial good will as the facilitator of that Agreement. On the basis of its success in brokering the 1998 Agreement, many officials who the Team interviewed noted that they would welcome USAID re-involvement in further talks among the countries to try to improve the Agreement.

AEAI also heard laudatory comments about USAID efforts to support energy in the region. These comments contributed to the impression that the region is anticipating that USAID will return to the region and provide assistance in the energy sector. Several officials interviewed indicated an

expectation that USAID would be the donor agency that would take the lead in the effort to develop a regional electricity market.

Question 13. What are the priorities for USAID involvement and what results may be possible over the next 3-5 years at funding levels of \$1 million per year, and at a level of \$3-5 million per year?

USAID has a pre existing obligation at the \$500,000 level for the preparation of four tasks under the PTRAs:

- Open Access energy sales
- Ancillary services
- Metering protocols
- Pro forma trading agreements.

Should the PTRAs loan finally be approved, the obligation can be carried out in one or two years. It could be done as a separate TA or it could be incorporated into a larger TA with a scope that includes other related energy and market related activities.

Activities related to power transmission and power supply to Afghanistan would be funded from USAID Afghanistan budgets and not CAR budget. In this regard, funding should be provided for technical assistance for the study leading to a recommendation for a transmission line connection between the CAR grid and Kabul. The proposed transmission planning study, including environmental studies, for the Afghanistan connection could be at a level of from \$400,000 to \$600,000.

One Million Per Year (See Table for detailed cash flows).

Support of WEC: \$200,000 for years one and two followed by a 30 month \$8 million river basin study to be funded by IFIs.

Support for USAID--World Bank/ADB Partnership: Assistance to Tajikistan in the reform of its electric distribution companies. Accompanied by World Bank loans. Four TAs under PTRAs: as noted ADB and EBRD have budgeted this as a \$500,000 USAID effort. over two years with \$100,00 in third year

Relief of transmission congestion. Funding of the technical assistance for transmission line route selection, preliminary engineering and environmental impact study of the 500 kV Regar – Kuljant line is recommended. This activity could be accomplished in about 18 months for a funding level of \$300,000. The start date for this effort would be determined in conjunction with Barki Tojik.

Support for Uniform transmission services pricing. This effort could be funded at an annual level of \$300,000 per year for three years. Given the pace of development this activity could start in 2007.

Support for Kyrgyzstan Energy Security: Involves loss reduction and energy efficiency technical support. \$125,000 for first year and 120,000 for next year.

Support for Privatization: Assistance in Kyrgyzstan for the transition of distribution companies to concessions private operation. \$75,000 for each of two years and \$100,00 for third and fourth year.

Support for Regulatory Agencies: This involves assistance to the Anti-Monopoly committee in Kazakhstan for the preparation of tariff methodologies. \$50,000 for two years

Support for USAID--World Bank Partnership: Assistance to Tajikistan in the reform of its electric distribution companies. Accompanied by World Bank loans. \$500,000 over three years

Expansion of WUA program in combination with OIP-type implementation program focused on Uzbekistan and/or Tajikistan and Kazakhstan. \$425,000 over five years

Preparation of river simulation computer models for Syr Darya and Amu Darya in support of WEC and river basin planning. \$500,000 over three years beginning in year three.

THREE TO FIVE MILLION PER YEAR

Support of WEC: A USAID \$300,000 effort for the first two years followed by a 30 month \$8 million IFI/USAID funded river basin study for the Amu Darya and Syr Darya rivers basins. Possible sharing of costs of river basin studies with Swiss.

Support for USAID--World Bank/ADB Partnership: Assistance to Tajikistan in the reform of its electric distribution companies. Accompanied by World Bank loans. Four TAs under PTRAs: as noted ADB and EBRD have budgeted this as a \$500,000 USAID effort for each of two years with \$250,000 for three years

Relief of transmission congestion: Funding of the technical assistance for transmission line route selection, preliminary engineering and environmental impact study of the 500 kV Regar--Kuljent line, and engineering design is recommended. This activity could be accomplished in about 18 months for a level of funding \$500,000 per year. with follow on work to assist in managing the task. The start date for this effort would be determined in conjunction with Barki Tojik.

Support for Uniform transmission service pricing, Hydro-Thermal Dispatch Software, CAR Grid Modeling and Regional planning assistance, and study of grid separation problem. These efforts could be funded at an annual level of \$750,000 per year for four years.

Support for Kyrgyzstan Energy Security: Involves loss reduction and energy efficiency technical support. \$175,000 for first year and 120,000 for next two years.

Support for Privatization: Assistance in Kyrgyzstan for the transition of distribution companies to concessions private operation. \$250,000 for each of five years.

Support for Regulatory Agencies: This involves assistance to the Anti-Monopoly committee in Kazakhstan for the preparation of tariff methodologies. \$250,000 for two years

Assistance to Tajikistan with reform of its electric distribution companies in association with World Bank (part of plan to support power transmission to Afghanistan. \$300,000 over two years

Expansion of WUA program by association with OIP-type institutional program to accelerate implementation of WUAs and improvements in irrigation efficiencies and agricultural output. \$300,000 first year and \$500,000 for two more years.

Development of river simulation models in support of WEC and river basin planning. \$700,000 over three years

Estimated Funding Low Level Approach	Years				
One Million per year Target Level in (000)	2006	2007	2008	2009	2010
in (000)					
Support of WEC: \$200,000 for years one and two followed by a coord with 30 month \$8 million river basin study to be funded by an IFL.	\$200	\$200	\$200	\$300	\$200
Support for USAID–World Bank ADB Partnership. Four TAs under PTRAs as noted ADB and EBRD have budgeted this as a \$500,000 USAID effort plus Follow on technical assistance.	\$200	\$200	\$100		
Relief of transmission congestion: Funding of the technical assistance for transmission line route selection, preliminary engineering and environmental impact study of the 500 kV Regar–Kuljent line is recommended. This activity could be accomplished in about 18 months for a level of funding of \$600,000. The start date for this effort would be determined in conjunction with Barki Tojik.	\$150	\$150	\$100	0	0
Support for Uniform transmission services pricing: This effort could be funded at an annual level of \$150,000 per year for three years. Given the pace of development this activity could start in 2007.			\$300	\$300	\$300
Support for Privatization	\$75	\$75	\$75	\$100	\$100
Kyrgyzstan Energy Security	\$125	\$120	\$0	\$0	\$0
Support for Regulatory Agencies	\$50	\$50	\$0	\$0	\$0
Afghanistan/Tajikistan Energy Supply	\$125	\$100	\$0	\$0	\$0
Power Exports from CAR	\$0	\$0	\$0	\$0	\$0
Expanded support for WUAs	\$75	\$75	\$75	\$100	\$100
Canal Automation	\$0	\$0	\$0	\$0	\$0
Resource Management Support Systems (River Gauging Stations and Metrology)	\$0	\$0	\$0	\$0	\$0
Continuation and expansion of coverage of water management computer models (NOPI/DSS) Syr Darya and Amu Darya	\$0	\$0	\$100	\$200	\$200
Assistance to the Ministry of Agriculture and Water Resources (MAWR), Uzbekistan		\$0	\$0	\$0	\$0
Annual Total	\$1,000	\$970	\$950	\$1,000	\$900

Estimated Funding Upper Level Approach	Year				
	2006	2007	2008	2009	2010
Three to Five Million per year Target in (000)					
Support of WEC: A USAID \$300,000 effort for the first two years followed by a 30 month \$8 million IFI/USAID funded river basin study for the Amu Darya and Syr Darya rivers basins.	\$300	\$300	\$300	\$300	\$200
Support for USAID–World Bank ADB Partnership. Four TAs under PTRAs as noted ADB and EBRD have budgeted this as a \$500,000 USAID effort plus Follow on technical assistance.	\$500	\$500	250	250	250
Relief of transmission congestion: Funding of the technical assistance for transmission line route selection, preliminary engineering and environmental impact study of the 500 kV Regar–Kuljent line is recommended. This activity could be accomplished in about 18 months for a level of funding \$500,000 including engineering design assistance. The start date for this effort would be determined in conjunction with Barki Tojik.	\$500	\$500			
Support for Uniform transmission service pricing: Hydro-Thermal Dispatch Software, CAR Grid Modeling and Regional planning assistance, and study of grid separation problem. These efforts could be funded at an annual level of \$500,000 to \$750,000 per year for three or four years.	\$750	\$750	\$750	\$750	\$500
Support for Privatization	\$250	\$250	\$250	\$250	\$250
Kyrgyzstan Energy Security	\$175	\$120	\$120	\$0	\$0
Support for Regulatory Agencies	\$250	\$250	\$0	\$0	\$0
Afghanistan, Tajikistan Energy Supply	\$125	\$100	\$0	\$0	\$0
Power Exports from CAR	\$100	\$0	\$0	\$0	\$0
Continue support for WUAs	\$300	\$500	\$500	\$0	\$0
Canal Automation	\$0	\$0	\$0	\$0	\$0
Resource Management Support Systems (River Gauging Stations and Metrology)	\$0	\$0	\$0	\$0	\$0
Continuation and expansion of coverage of water management computer models (NOPI/DSS) for Syr Darya and Amu Darya	\$0	\$0	\$200	\$200	\$300
Assistance to the Ministry of Agriculture and Water Resources (MAWR), Uzbekistan	\$0	\$0	\$0	\$0	\$0
Annual total	\$3,250	\$3,270	\$2,370	\$1,750	\$1,500